

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-196815

(43)Date of publication of application : 12.07.2002

(51)Int.Cl.

G05B 23/02
G05B 15/02
H01L 21/02
H01L 21/027
H01L 21/68

(21)Application number : 2000-398477

(71)Applicant : TOKYO ELECTRON LTD

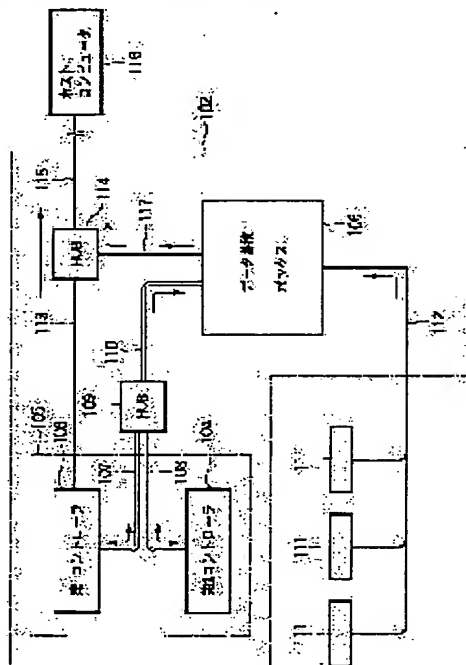
(22)Date of filing : 27.12.2000

(72)Inventor : YOSHIMOTO YUJI
KAMIMURA RYOICHI
OGATA KUNIE
DEGUCHI YOICHI

(54) PROCESSOR AND INFORMATION STORAGE DEVICE AND INFORMATION STORAGE METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a processor capable of easily grasping the history of processing, and an information storage device and method capable of easily storing the history of such processing.
SOLUTION: This processor is provided with a processor main body 101 equipped with a plurality of processing parts for executing prescribed processing to an object W to be processed and a carrying device for carrying the object to be processed between each processing part, a first control part 103 for controlling the whole processor including the carrying device, a second control part 104 for controlling the plurality of processing parts, and an information storing part 106 for fetching a signal to be transferred between the first control part 103 and the second control part 104, and storing the information.



LEGAL STATUS

[Date of request for examination]

27.12.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the
examiner's decision of rejection or application
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of
rejection]

[Date of requesting appeal against examiner's decision
of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

NOTICES

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The processor characterized by providing the information storage section which incorporates the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which controls the body of a processor, and the signal outputted from said controlling mechanism, and accumulates the information.

[Claim 2] It is the processor according to claim 1 which said controlling mechanism has the 1st control section and 2nd control section which perform control which is different to said body of a processor, respectively, and is characterized by said information storage section incorporating at least one of the signal from said 1st control section, the signal from said 2nd control section, and the signals that are delivered and received between said 1st control section and 2nd control section.

[Claim 3] The processor characterized by providing the information storage section which incorporates the signal delivered and received between the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and the 1st control section of said controlling mechanism and the 2nd control section, and accumulates the information.

[Claim 4] It is the processor according to claim 3 characterized by for said body of a processor having the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section, and for said information storage section incorporating the signal from said additional detecting element, and accumulating the information.

[Claim 5] The body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The processor characterized by providing the information storage section which incorporates the signal delivered and received between the 1st control section which controls the whole processor containing said transport device, the 2nd control section which controls said two or more processing sections, and said 1st control section and 2nd control section, and accumulates the information.

[Claim 6] It is the processor according to claim 4 characterized by for said body of a processor having the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section, and for said information storage section incorporating the signal from said additional detecting element, and accumulating the information.

[Claim 7] The processor according to claim 5 or 6 with which said information from the 1st control section and information from said information storage section are characterized by providing further the information processing section which is inputted and analyzes inputted information.

[Claim 8] Said information storage section is a processor given in any 1 term of claim 5 to claim 7 characterized by accumulating at least one sort in measurement information, alarm information, the performance information in said processing section, and the processed object conveyance information by said transport device.

[Claim 9] The information-storage equipment characterized by to provide the information-storage section which is information-storage equipment which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which controls the body of a processor, and accumulates information, and a signal supply means take out the signal outputted from said controlling mechanism, and supply said information-storage section.

[Claim 10] It is information storage equipment according to claim 9 which said controlling mechanism has the 1st control section and 2nd control section which perform control which is different to said body of a processor,

respectively, and is characterized by said information storage section incorporating and accumulating at least one of the signal from said 1st control section, the signal from said 2nd control section, and the signals that are delivered and received between said 1st control section and 2nd control section.

[Claim 11] It is information storage equipment which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor. Information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between the information storage section which accumulates information, and the 1st control section of said controlling mechanism and the 2nd control section, and to supply said information storage section.

[Claim 12] Information storage equipment according to claim 11 characterized by providing further the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section, and an additional detecting-signal supply means to supply the detecting signal of said additional detecting element to said information storage section.

[Claim 13] The body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The information storage section which is information storage equipment which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections, and accumulates information, Information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between said 1st control section and 2nd control section, and to supply said information storage section.

[Claim 14] Information storage equipment according to claim 13 characterized by providing the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section, and an additional detecting-signal supply means to supply the detecting signal of said additional detecting element to said information storage section.

[Claim 15] Said information storage section is information storage equipment according to claim 13 or 14 characterized by accumulating at least one sort in measurement information, alarm information, the performance information in said processing section, and the processed object conveyance information by said transport device.

[Claim 16] The information storage approach which is the information storage approach which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which controls the body of a processor, and is characterized by taking out the signal outputted from said controlling mechanism, and accumulating the information.

[Claim 17] Said controlling mechanism is the information storage approach according to claim 16 characterized by accumulating at least one of the signals which have the 1st control section and 2nd control section which perform control which is different to said body of a processor, respectively, and are delivered and received between the signal from said 1st control section, the signal from said 2nd control section, and said 1st control section and 2nd control section.

[Claim 18] The information storage approach which is the information storage approach which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and is characterized by taking out the signal delivered and received between the 1st control section of said controlling mechanism, and the 2nd control section, and accumulating the information.

[Claim 19] The information storage approach according to claim 18 characterized by detecting the information to which transfer is not carried out between said 1st control section and 2nd control section, and accumulating the information.

[Claim 20] The body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, It is the information storage approach which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections. The information storage

approach characterized by taking out the signal delivered and received between said 1st control section and 2nd control section, and accumulating the information.

Claim 21] The information storage approach according to claim 20 characterized by detecting the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section; and accumulating the information.

Claim 22] The ejection of said signal is every lot of every processed substrate and a processed substrate, and the information storage approach given in any 1 term of claim 16 to claim 21 characterized by being either for every processing.

Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the processor which contains the 1st control section and 2nd control section in control of the body of a processor, the information storage equipment used for it, and the information storage approach in detail about the processor which performs predetermined processing to a processed object.

[0002]

[Description of the Prior Art] In manufacture of a semiconductor device, various processes, such as a photolithography process for forming a pattern and an etching process which etches the predetermined film according to the pattern, are used for the membrane formation process which forms the predetermined film on the semi-conductor wafer as a processed substrate, and the predetermined film, and processors, such as membrane formation equipment, a resist spreading developer, and an etching system, are used for every processing of these processes.

[0003] It explains taking the case of the resist spreading developer which performs a photolithography process among these processors. In such a photolithography process, after performing hydrophobing processing with an adhesion process unit first and cooling in a cooling unit to the semi-conductor wafer by which washing processing was carried out, spreading formation of the photoresist film is carried out in a resist spreading unit. After performing prebaking processing in the hot plate unit which heat-treats to the semi-conductor wafer with which this photoresist film was formed, it cools in a cooling unit and a predetermined pattern is exposed with an aligner. Then, after performing postexposure BEKU processing in a hot plate unit to the semi-conductor wafer after exposure, it cools in a cooling unit, a developer is applied in a development unit, and an exposure pattern is developed. And finally, postbake processing is performed in a hot plate unit, and the heat conversion for macromolecule-izing and the adhesion of a semi-conductor wafer and a pattern are strengthened. An above-mentioned resist spreading developer collects in one two or more processing units which perform the process except exposure processing among such a series of down stream processing, and perform each processing, is constituted, and has the transport device in which the carrying-in appearance of a wafer is possible to each all] of these units.

[0004] Control of such a resist spreading developer is performed by the 1st control section which performs the recipe of processing, management of a transport device, the communication link with a host computer, etc., and the 2nd control section which controls each processing in each processing unit by the command from the 1st control section.

[0005] In the above device control, the 1st control section outputs information required for processing of each processing unit to the 2nd control section, by the 2nd control section, the element of each processing unit is controlled by the information from a sensor required for control, and information from the 1st control section, and the control information in that case is transmitted to a host computer from the 1st control section.

[0006]

[Problem(s) to be Solved by the Invention] By the way, although information required for control has gathered, and the information after control is also managed in the above control. Recently, point to much more highly precise-ization of control of each processing, and a more prompt action of an equipment trouble etc. is desired. Therefore, for measurement data, such as not only the information after being controlled but temperature in actual processing, alarm data, the data of a drive system, etc. to come to hand, and to grasp the hysteresis of processing in a detail is desired.

0607] However, in order to grasp such hysteresis in the conventional processor, it is necessary to prepare a metering device etc. for every data which are going to grasp hysteresis, and complicated. Moreover, the processing element which should grasp hysteresis is immense and it is very unreal to attach such a metering device etc. for every processing element of these.

0008] This invention is made in view of this situation, and it aims at offering the processor which can grasp the hysteresis of processing easily, the information storage equipment which can accumulate the hysteresis of such processing easily, and the information storage approach.

0009]

Means for Solving the Problem] In order to solve the above-mentioned technical problem, in the 1st viewpoint of this invention, the processor characterized by providing the information storage section which incorporates the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which controls the body of a processor, and the signal outputted from said controlling mechanism, and accumulates the information is offered.

0010] The 2nd viewpoint of this invention offers the processor characterized by providing the information storage section which incorporates the signal delivered and received between the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and the 1st control section of said controlling mechanism and the 2nd control section, and accumulates the information.

0011] The body of a processor equipped with the transport device which conveys a processed object in the 3rd viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The processor characterized by providing the information storage section which incorporates the signal delivered and received between the 1st control section which controls the whole processor containing said transport device, the 2nd control section which controls said two or more processing sections, and said 1st control section and 2nd control section, and accumulates the information is offered.

0012] It is information-storage equipment which accumulates information in the processor which consists of a controlling mechanism which controls the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by the 4th viewpoint of this invention, and the information-storage equipment characterized by to provide the information-storage section which accumulates information, and a signal supply means take out the signal outputted from said controlling mechanism, and supply said information-storage section offers.

0013] The body of a processor which carries out predetermined processing to a processed object in the 5th viewpoint of this invention, The information storage section which is information storage equipment which accumulates information in the processor which consists of a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and accumulates information, The information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between the 1st control section of said controlling mechanism and the 2nd control section, and to supply said information storage section is offered.

0014] The body of a processor equipped with the transport device which conveys a processed object in the 6th viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The information storage section which is information storage equipment which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections, and accumulates information, The information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between said 1st control section and 2nd control section, and to supply said information storage section is offered.

0015] It is the information storage approach which accumulates information in the processor which consists of a controlling mechanism which controls the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by the 7th viewpoint of this invention, and the information storage approach characterized by taking out the signal outputted from said controlling mechanism, and accumulating the information is offered.

0016] It is the information-storage approach which accumulates information in the processor which consists of a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by

the 8th viewpoint of this invention, and the information-storage approach characterized by to take out the signal delivered and received between the 1st control section of said controlling mechanism and the 2nd control section, and to accumulate the information offers.

[0017] The body of a processor equipped with the transport device which conveys a processed object in the 9th viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, It is the information storage approach which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections. The information storage approach characterized by taking out the signal delivered and received between said 1st control section and 2nd control section, and accumulating the information is offered.

[0018] In order to solve the above-mentioned technical problem, as a result of repeating examination, taking out the signal outputted from a controlling mechanism, and by taking out the signal especially delivered and received between the 1st control section and the 2nd control section, without using a special measuring instrument, it hits on an idea of this inventions for information required for grasp of the hysteresis of processing to be able to come to hand easily, and they came to complete this invention. That is, since the signal outputted from a controlling mechanism and especially the information that are delivered and received between the 1st control section and the 2nd control section include information required in order to grasp the hysteresis of processing, such as detection information for processing, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the information storage section, without using a special measuring instrument at all.

[0019] In controlling the body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section as shown in the 3rd viewpoint of the above as a more concrete example The 1st control section which controls the whole processor containing a transport device, and the 2nd control section which controls two or more processing sections are used. The case where the signal delivered and received between the 1st control section and the 2nd control section is accumulated in the information storage section is mentioned. In this case Since the 2nd control section outputs the detection information on each processing section to the 1st control section, the hysteresis of the processing in the processing section of operation can be easily grasped by incorporating the signal delivered and received among these.

[0020] In this case, it is desirable to have the additional detecting element which detects the information to which transfer is not carried out between the 1st control section and the 2nd control section, and for the information storage section to incorporate the signal from this additional detecting element, and to make it accumulate. For example, since this signal is not delivered and received between the 1st control section and the 2nd control section when a driving signal is given to driving members, such as a bulb, from the 2nd control section From the signal delivered and received between the 1st control section and the 2nd control section, although this information cannot be taken out, by detecting such information by the additional detecting element, and making it accumulate in the information storage section, it is more highly precise and can perform grasp of the hysteresis of processing.

[0021]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to an accompanying drawing. Drawing 1 - drawing 4 show the whole resist spreading developer configuration concerning 1 operation gestalt of this invention, and get down, and, for drawing 1 , an outline perspective view and drawing 2 are [an outline front view and drawing 4 of an outline top view and drawing 3] outline side elevations.

[0022] This resist spreading developer 100 controlled the body 101 of equipment, and the body 101 of equipment, and is equipped with the control and the data accumulation section 102 which accumulates information. By the wafer cassette CR, per two or more sheets, for example, 25 sheets, the body 101 of equipment takes out the processed substrate (it is only described as a "wafer" below) W, for example, a semiconductor wafer, from carrying in or a substrate processor to a substrate processor, or from the exterior it The cassette station 10 for carrying in and taking out Wafer W to the wafer cassette CR, The processing station 12 which comes to carry out multistage arrangement of the various processing units of single wafer processing which performs one predetermined processing at a time to Wafer W in a spreading development process in a predetermined location, It has the configuration which connected to one the interface section 14 for delivering Wafer W between the aligners (not shown) which adjoin this processing station 12 and are formed. In addition,

control and the data accumulation section 102 are established in the lower part of the cassette station 10.

[0023] The cassette station 10 is movable to a display 16, the cassette installation base 20, the direction of X and the direction of Y, and a Z direction, is constituted by the wafer conveyance device 22 in which it has a pivotable arm 22a for wafer conveyance in the direction of theta, and can lay two or more four wafer cassettes CR on the cassette installation base 20, for example.

[0024] The 1st processing unit group G1 and the 2nd processing unit group G2 which have arranged to multistage the liquid processing unit which the processing station 12 puts Wafer W on a spin chuck within Cup CP, and performs predetermined processing. It consists of 3rd processing unit group G3 and the 4th processing unit group G4 which allotted the heat treatment unit which puts Wafer W on the installation base SP, and performs predetermined processing to multistage, and a main wafer conveyance device 24 of a perpendicular conveyance mold.

[0025] The main wafer conveyance device 24 has equipped the wafer transport device 90 free [rise and fall in the vertical direction (Z direction)] inside the tubed base material 91, as shown in drawing 4 . The tubed base material 91 has become pivotable with the rotation driving force of a motor (not shown), and its wafer transport device 90 is also pivotable in one in connection with it.

[0026] The wafer transport device 90 is equipped with two or more attachment components (pincette) 93 which can move to the cross direction of the conveyance pedestal 92 freely, and realizes delivery of the wafer W between each processing unit by these attachment components 93.

[0027] By the 1st processing unit group G1, the resist spreading unit (COT) which carries out spreading formation of the resist film on a wafer front face with a spin coat method as a liquid processing unit, and the development unit (DEV) which develops the circuit pattern after exposure have put on two steps. The resist spreading unit (COT) and the development unit (DEV) have also put the 2nd processing unit group G2 on two steps.

[0028] By 3rd processing unit group G3 and the 4th processing unit group G4 As a thermal processing unit, for example, the cooling unit which cools Wafer W to predetermined temperature (COL), The adhesion unit which carries out hydrophobing processing of this before applying a photoresist to Wafer W (AD), The extension unit (EXT) for delivering Wafer W between the alignment unit (ALIM) for justifying Wafer W and each station, the hot plate unit (H.P.) which heat-treats Wafer W at predetermined temperature have put on eight steps.

[0029] The pickup cassette CR of portability is arranged in the forward surface part of the interface section 14, the circumference aligner 28 is arranged at the tooth-back section, and the wafer conveyance device 26 is formed in the center section. It has arm 26a for wafer conveyance, and this arm 26a for wafer conveyance moves to the direction of X, and a Z direction, and that of this wafer conveyance device 26 is accessible to Cassette CR and the circumference aligner 28. Moreover, this arm 26a for wafer conveyance is pivotable in the direction of theta, and an adjoining aligner side carries out wafer delivery, and it can also access now the extension unit (EXT) belonging to the multistage unit of the 4th processing unit group G4 by the side of the processing station 12 also on a base (not shown).

[0030] Next, with reference to drawing 5 , control and the data accumulation section 102 are explained. Drawing 5 is the block diagram showing the configuration of control and the data accumulation section 102. This control and data accumulation section 102 have the control box 105 which consists of the 1st controller 103 and the 2nd controller 104, and the data accumulation box 106 which incorporates and accumulates the signal delivered and received between the 1st controller 103 and the 2nd controller 104.

[0031] The 1st controller 103 in a control box 105 controls the body of processor 101 whole, and mainly performs recipe management, management of wafer conveyance, and management of the display screen. Moreover, the 1st controller 103 is connected to the host computer 116, and the communication link with a host computer 116 is also performed. And based on the data about these, a command is given to the 2nd controller 104.

[0032] The 2nd controller 104 in a control box 105 controls each processing unit of the body 101 of equipment, and is connected with the sensor, the driving member, etc. through two or more I/O boards. Measurement data, such as temperature and humidity, alarm data, detection data, etc. are outputted to the 1st controller 103, and elements, such as a drive system of each processing unit, are controlled based on a command, sensor information, etc. on the 1st controller 103.

[0033] The signal line 108 connected to the signal line 107 connected to the 1st controller 103 and the 2nd controller 104 is connected to HUB109, and this HUB109 and data accumulation box 106 are connected with the signal line 110. Therefore, a part of signal [at least] delivered and received by the 1st controller 103 and the

2nd controller 104 can be incorporated and accumulated to the data accumulation box 106 through HUB109. Incorporation of the signal in this case is performed every 2 seconds.

[0034] Moreover, two or more additional sensors (additional detecting element) 111 for detecting the driving signal given to driving members, such as the signal which is not delivered and received by the 1st controller 103 and the 2nd controller 104, for example, a bulb etc., are formed, and these additional sensors 111 are connected to the data accumulation box 106 through the signal line 112. Therefore, the information on this additional sensor 111 can be incorporated and accumulated to the data accumulation box 106. Incorporation of the signal in this case can be performed at intervals of 2 or less seconds.

[0035] The 1st controller 103 is connected to HUB114 through a signal line 113, it connects with the host computer 116 through the signal line 115, and HUB114 transmits the information on the 1st controller 103 to a host computer 116. Moreover, the signal line 117 prolonged from the data accumulation box 106 is connected to HUB114, and the are recording information on the data accumulation box 106 is also transmitted to a host computer 116 through HUB114. Therefore, it is possible to process information in the information from the 1st controller 103 and the information from the data accumulation box 106, and to analyze data with a host computer 116.

[0036] The body interface 121 of equipment which adopts the signal delivered and received by the 1st controller 103 and the 2nd controller 104 as the data accumulation box 106 is shown in drawing 6, The body agent 122 of equipment who processes the signal, and the additional sensor interface 123 which takes in the information from the additional sensor 111, With the are recording data manager 125 who delivers and receives data between the additional sensor agent 124 who processes the signal, and the body agent 122 of equipment and the additional sensor agent 124, and performs processing and are recording of the further data It has the database management software 126, the database storage section 127 which memorizes the database for data accumulation, and the are recording data storage section 128 which memorizes are recording data.

[0037] Thus, in the resist spreading developer 100 constituted, it takes out one wafer W before processing at a time according to the wafer conveyance device 22 from the wafer cassette CR, and carries in to an alignment unit (ALIM). Subsequently, the wafer W positioned here is taken out according to the main wafer conveyance device 24, it carries in to an adhesion unit (AD), and adhesion processing is performed. Wafer W is taken out according to the main wafer conveyance device 24 after termination of this adhesion processing, and it conveys to a cooling unit (COL), and cools here. Subsequently, Wafer W is conveyed to a resist spreading unit (COT), and resist spreading is performed, and further, prebaking processing is performed in a hot plate unit (H.P.), and it conveys in the interface section 14 through extension cooling (EXTCOL), and conveys to the aligner which joins from there. Furthermore, the wafer W with which exposure processing was made with the aligner is conveyed to the processing station 12 through the interface section 14 and an extension unit (EXT) according to the wafer conveyance device 26. At the processing station 12, after performing postbake processing and cooling in a cooling unit (COL) in the hot plate unit (H.P.) after conveying Wafer W to a hot plate unit (H.P.) according to the main wafer conveyance device 24, performing postexposure processing, conveying to a development unit (DEV) further and performing a development, it conveys to the cassette station 10 through an extension unit (EXT). The wafer conveyance device 22 contains the wafer W with which predetermined processing was made as mentioned above to the wafer cassette CR.

[0038] Such a series of processings are controlled by the control box 105 of control and the data accumulation section 102 as mentioned above. And a part of signal [at least] delivered and received between the 1st controller 103 of a control box 105 and the 2nd controller 104 is incorporated and accumulated through HUB109 to the data accumulation box 106 every 2 seconds. At this time, this signal is not involved HUB109, but is processed by the body agent 122 of equipment, and the are recording data manager 125 through the body interface 121 of equipment, and is accumulated in the are recording data storage section 128.

[0039] On the other hand, the information from the additional sensor 111 is incorporated and accumulated in the cycle of 2 or less seconds to the data accumulation box 106. At this time, this signal is processed by the additional sensor agent 124 and the are recording data manager 125 through the additional sensor interface 123, and is similarly accumulated in the are recording data storage section 128.

[0040] The data stored in the database and the are recording data storage section 128 for the data accumulation accumulated in the database storage section 127 are processed by the predetermined database management software 126, and are outputted to a host computer 116 through HUB114.

[0041] Among such are recording data, since measurement data, such as temperature and humidity, are the period need throughout processing, they are continuously stored for every fixed cycle. Moreover, except it, it is

accumulated by every wafer, every lot, and either for every processing, and is accumulated serially. For this reason, the hysteresis of processing can be grasped from the data stored in the data accumulation box 106. As timing of data accumulation, recording can also be started from the time of Wafer W being carried in to a processing unit, and recording can also be started after processing of a processing unit is started. Moreover, data can be stored only once in the case of initiation of a lot, or completion, and data can also be similarly stored only once also about Wafer W in the case of initiation (ejection from a carrying-in side cassette) of processing, or completion (delivery to a taking-out side cassette).

[0042] As data which are sampled by the data accumulation box 106 and stored in it, the following five things are illustrated as an example of representation.

(1) Data (5) wafer conveyance of drive systems, such as a dispensing data (4) cylinder of the processing liquid in liquid processing units, such as a data (3) spreading processing unit (COT) of the alarm emitted when a trouble arises during measurement data (2) processing of temperature, humidity, an atmospheric pressure, etc., and processing information on a processing unit [0043] Among more than, about the measurement data of (1), it is controlled by the 2nd controller 104, and since it is outputted to the 1st controller 103 from the 2nd controller 104, it is usually accumulated in the data accumulation box 106 through HUB109 between the 1st controller 103 and the 2nd controller 104. However, in the case of the measurement data which are not used for the usual control, the additional sensor 111 can detect, and it can be made to accumulate in the data accumulation box 106 directly.

[0044] About the alarm data of (2), since it is usually emitted in each processing unit, the 2nd controller 104 receives an alarm and it is outputted to the 1st controller 103 from the 2nd controller 104. Therefore, this data can be incorporated and stored in the data accumulation box 106 through HUB109. By storing this data, very fine hysteresis — when the alarm was emitted and whether the alarm was emitted while carrying out what kind of processing where of which processing unit — can be grasped.

[0045] In case the regurgitation of the processing liquid from a nozzle 131 is controlled by closing motion of the air operation bulb 133 through piping 132 about the dispensing data of (3) to be shown in drawing 7 Although an ON/OFF signal is outputted to the solenoid valve 134 for opening and closing the air operation bulb 133 through the I/O board 130 from the 2nd controller 104 The additional sensor 111 can be connected to the control line 135, the additional sensor 111 can detect the above-mentioned ON/OFF signal, and the data can be stored up in the data accumulation box 106. They can deliver and receive such data between the 1st controller 103 and the 2nd controller 104, and although such data are stored up in the immediate-data are recording box 106 from the additional sensor 111 in this way since they are not usually delivered and received between the 1st controller 103 and the 2nd controller 104, they can be made to store them in the data accumulation box 106 through HUB109 in that case. By storing such data, it can grasp [all] at which time of day the air operation bulb 133 opened, or whether it closed, for example, the data and actual dispensing data can be associated and hysteresis can also be grasped.

[0046] The pneumatic cylinder used for rise and fall of a wafer etc. as a typical thing of the drive system of (4) can be mentioned. The control in that case As shown in drawing 8 Output a control signal from the 2nd controller 104 through the I/O board 140 to either the 1st solenoid valve (SOL1) 144 and the 2nd solenoid valve (SOL2) 145, and migration of piston 141a of a pneumatic cylinder 141 is made to start. The detecting signal of either the 1st position sensor (sensor 1) 142 and the 2nd position sensor (sensor 2) 143 is outputted to the 2nd controller 104 through the I/O board 140. It is carried out by stopping migration of piston 141a of a pneumatic cylinder 141 based on the signal. In this case, the additional sensor 111 can be connected to the signal line 146, 147 of the 1st and 2nd position sensors 142, 143, and the control line 148, 149 of the 1st and 2nd solenoid valves 144, 145, respectively, the additional sensor 111 can detect the detecting signal of the 1st and 2nd position sensors 142, 143, and the keying signal of the 1st and 2nd solenoid valves 144, 145, and that data can be stored up in the data accumulation box 106. Dispersion in the timing of operation for every pneumatic cylinder which has grasped the hysteresis of the timing of a pneumatic cylinder 141 of operation by this, for example, has not been grasped until now etc. can be grasped. Therefore, fine tuning of timing of operation etc. is attained.

[0047] The data actually stored grasp serially the closing motion timing of the 1st and 2nd solenoid valves 144, 145, and the ON/OFF timing of the 1st and 2nd position sensors 142, 143, as shown in drawing 9 . That is, if the 1st solenoid valve (SOL1) 144 is first made open, when the rise of piston 141a will be started and the 1st position sensor (sensor 1) 142 will operate (ON), the rise of piston 141a stops. Next, if close and the 2nd solenoid valve (SOL2) 145 are made open, descent of piston 141a is started, and when the 2nd position sensor (sensor 2) 143 operates (ON), descent of piston 141a will suspend the 1st solenoid valve (SOL1) 144.

[0048] Such data can be delivered and received between the 1st controller 103 and the 2nd controller 104, and although it is made to accumulate in the immediate-data are recording box 106 from the additional sensor 111 in this way since the data of such a drive system are not usually delivered and received between the 1st controller 103 and the 2nd controller 104, either, it can be made to accumulate in the data accumulation box 106 through HUB109 in that case.

[0049] About wafer conveyance of (5), and the processing information on a processing unit, since the management information of wafer conveyance of the 1st controller 103, the receipts-and-payments information on each processing unit in the 2nd controller 104, and the processing information on each processing unit are delivered and received among these, this data is taken out through HUB109 and it accumulates in the data accumulation box 106. As wafer conveyance information to accumulate, there is information, such as carrying-in initiation of the wafer to each processing unit and each taking-out termination. Moreover, as processing information on each processing unit to accumulate, there is information, such as initiation of the processing in each processing unit and termination.

[0050] Thus, since the signal delivered and received between the 1st controller 103 and the 2nd controller 104 is taken out via HUB109 to predetermined timing and it accumulates in the data accumulation box 106, data required for grasp of the hysteresis of processing can come to hand easily, without being able to store data automatically in the case of processing, and using a special instrumentation for it. That is, since the data delivered and received between the 1st controller 103 and the 2nd controller 104 contain data required in order to grasp the hysteresis of processing, such as detection data for processing, and alarm data, processed data, wafer conveyance data, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the data accumulation box 106.

[0051] And since the data with which transfer is not performed between the 1st controller 103 and the 2nd controller 104 using the additional sensor 111 as mentioned above are detected and it was made to accumulate in the data accumulation box 106, the data to store can be made more into Oshi, it is more highly precise and grasp of the hysteresis of processing can be performed.

[0052] In addition, this invention can be variously changed within the limits of the thought of this invention, without being limited to the above-mentioned operation gestalt. For example, although the data delivered and received between the 1st controller 103 and the 2nd controller 104 were incorporated and stored in the data accumulation box 106 with the above-mentioned operation gestalt. The data from the 1st controller 103 are incorporated, may make it accumulate, and May also incorporate the data from the 2nd controller 104 and The data from the 1st controller 103, It is good even if it incorporates and accumulates two or more of the data from the 2nd controller 104, and the data which are delivered and received between the 1st controller 103 and the 2nd controller 104. Moreover, what is necessary is for two controllers not to necessarily exist, to incorporate the signal outputted from a controlling mechanism, and just to make it accumulate. Furthermore, although the data from the additional sensor 111 were directly stored in the data accumulation box 106, if all information is delivered and received between the 1st controller 103 and the 2nd controller 104, the additional sensor 111 will not not necessarily have the need.

[0053] Although the above-mentioned operation gestalt showed the case where this invention was applied to a resist spreading developer further again, if the thought of this invention is taken into consideration, it is applicable not only to a resist spreading developer but all processors.

[0054]

[Effect of the Invention] As explained above, according to this invention, information required for grasp of the hysteresis of processing can come to hand easily taking out the signal outputted from a controlling mechanism, and by taking out the signal especially delivered and received between the 1st control section and the 2nd control section, without using a special measuring instrument. That is, since the signal outputted from a controlling mechanism and especially the information that are delivered and received between the 1st control section and the 2nd control section include information required in order to grasp the hysteresis of processing, such as detection information for processing, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the information storage section, without using a special measuring instrument at all.

[0055] By moreover, ** which the information storage section incorporates the signal from this additional detecting element, and accumulates it using the additional detecting element which detects the information to which transfer is not carried out between the 1st control section and the 2nd control section From the signal delivered and received between the 1st control section and the 2nd control section, the information which

cannot be taken out can be stored up in the information storage section, it is more highly precise and grasp of the hysteresis of processing can be performed.

[Translation done.]

* NOTICES *

JPO and NCIP1 are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the processor which contains the 1st control section and 2nd control section in control of the body of a processor, the information storage equipment used for it, and the information storage approach in detail about the processor which performs predetermined processing to a processed object.

[Translation done.]

< NOTICES *

IPO and NCIPi are not responsible for any damages caused by the use of this translation.

- . This document has been translated by computer. So the translation may not reflect the original precisely.
- 2. **** shows the word which can not be translated.
- 3. In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] In manufacture of a semiconductor device, various processes, such as a photolithography process for forming a pattern and an etching process which etches the predetermined film according to the pattern, are used for the membrane formation process which forms the predetermined film on the semi-conductor wafer as a processed substrate, and the predetermined film, and processors, such as membrane formation equipment, a resist spreading developer, and an etching system, are used for every processing of these processes.

0003] It explains taking the case of the resist spreading developer which performs a photolithography process among these processors. In such a photolithography process, after performing hydrophobing processing with an adhesion process unit first and cooling in a cooling unit to the semi-conductor wafer by which washing processing was carried out, spreading formation of the photoresist film is carried out in a resist spreading unit. After performing prebaking processing in the hot plate unit which heat-treats to the semi-conductor wafer with which this photoresist film was formed, it cools in a cooling unit and a predetermined pattern is exposed with an aligner. Then, after performing postexposure BEKU processing in a hot plate unit to the semi-conductor wafer after exposure, it cools in a cooling unit, a developer is applied in a development unit, and an exposure pattern is developed. And finally, postbake processing is performed in a hot plate unit, and the heat conversion for macromolecule-izing and the adhesion of a semi-conductor wafer and a pattern are strengthened. An above-mentioned resist spreading developer collects in one two or more processing units which perform the process except exposure processing among such a series of down stream processing, and perform each processing, is constituted, and has the transport device in which the carrying-in appearance of a wafer is possible to each all] of these units.

0004] Control of such a resist spreading developer is performed by the 1st control section which performs the recipe of processing, management of a transport device, the communication link with a host computer, etc., and the 2nd control section which controls each processing in each processing unit by the command from the 1st control section.

0005] In the above device control, the 1st control section outputs information required for processing of each processing unit to the 2nd control section, by the 2nd control section, the element of each processing unit is controlled by the information from a sensor required for control, and information from the 1st control section, and the control information in that case is transmitted to a host computer from the 1st control section.

Translation done.]

NOTICES *

IPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2. **** shows the word which can not be translated.
- 3. In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to this invention, information required for grasp of the hysteresis of processing can come to hand easily taking out the signal outputted from a controlling mechanism, and by taking out the signal especially delivered and received between the 1st control section and the 2nd control section, without using a special measuring instrument. That is, since the signal outputted from a controlling mechanism and especially the information that are delivered and received between the 1st control section and the 2nd control section include information required in order to grasp the hysteresis of processing, such as detection information for processing, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the information storage section, without using a special measuring instrument at all.

[0055] Moreover, ** which the information storage section incorporates the signal from this additional detecting element, and accumulates it using the additional detecting element which detects the information to which transfer is not carried out between the 1st control section and the 2nd control section, From the signal delivered and received between the 1st control section and the 2nd control section, the information which cannot be taken out can be stored up in the information storage section, it is more highly precise and grasp of the hysteresis of processing can be performed.

[Translation done.]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, although information required for control has gathered and the information after control is also managed in the above control Recently, point to much more highly precise-ization of control of each processing, and a more prompt action of an equipment trouble etc. is desired. Therefore, for measurement data, such as not only the information after being controlled but temperature in actual processing, alarm data, the data of a drive system, etc. to come to hand, and to grasp the hysteresis of processing in a detail is desired.

[0007] However, in order to grasp such hysteresis in the conventional processor, it is necessary to prepare a metering device etc. for every data which are going to grasp hysteresis, and complicated. Moreover, the processing element which should grasp hysteresis is immense and it is very unreal to attach such a metering device etc. for every processing element of these.

[0008] This invention is made in view of this situation, and it aims at offering the processor which can grasp the hysteresis of processing easily, the information storage equipment which can accumulate the hysteresis of such processing easily, and the information storage approach.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, in the 1st viewpoint of this invention, the processor characterized by providing the information storage section which incorporates the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which controls the body of a processor, and the signal outputted from said controlling mechanism, and accumulates the information is offered.

[0010] The 2nd viewpoint of this invention offers the processor characterized by providing the information storage section which incorporates the signal delivered and received between the body of a processor which carries out predetermined processing to a processed object, the controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and the 1st control section of said controlling mechanism and the 2nd control section, and accumulates the information.

[0011] The body of a processor equipped with the transport device which conveys a processed object in the 3rd viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The processor characterized by providing the information storage section which incorporates the signal delivered and received between the 1st control section which controls the whole processor containing said transport device, the 2nd control section which controls said two or more processing sections, and said 1st control section and 2nd control section, and accumulates the information is offered.

[0012] It is information-storage equipment which accumulates information in the processor which consists of a controlling mechanism which controls the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by the 4th viewpoint of this invention, and the information-storage equipment characterized by to provide the information-storage section which accumulates information, and a signal supply means take out the signal outputted from said controlling mechanism, and supply said information-storage section offers.

[0013] The body of a processor which carries out predetermined processing to a processed object in the 5th viewpoint of this invention, The information storage section which is information storage equipment which accumulates information in the processor which consists of a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, and accumulates information, The information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between the 1st control section of said controlling mechanism and the 2nd control section, and to supply said information storage section is offered.

[0014] The body of a processor equipped with the transport device which conveys a processed object in the 6th viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, The information storage section which is information storage equipment which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections, and accumulates information, The information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between said 1st control section and 2nd control section, and to supply said information storage section is offered.

[0015] It is the information storage approach which accumulates information in the processor which consists of a controlling mechanism which controls the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by the 7th viewpoint of this invention, and the information storage approach characterized by taking out the signal outputted from said controlling mechanism, and

accumulating the information is offered.

[0016] It is the information-storage approach which accumulates information in the processor which consists of a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor which carries out predetermined processing to a processed object, and the body of a processor by the 8th viewpoint of this invention, and the information-storage approach characterized by to take out the signal delivered and received between the 1st control section of said controlling mechanism and the 2nd control section, and to accumulate the information offers.

[0017] The body of a processor equipped with the transport device which conveys a processed object in the 9th viewpoint of this invention between two or more processing sections which carry out predetermined processing to a processed object, and each processing section, It is the information storage approach which accumulates information in the processor which consists of the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections. The information storage approach characterized by taking out the signal delivered and received between said 1st control section and 2nd control section, and accumulating the information is offered.

[0018] In order to solve the above-mentioned technical problem, as a result of repeating examination, taking out the signal outputted from a controlling mechanism, and by taking out the signal especially delivered and received between the 1st control section and the 2nd control section, without using a special measuring instrument, it hits on an idea of this inventions for information required for grasp of the hysteresis of processing to be able to come to hand easily, and they came to complete this invention. That is, since the signal outputted from a controlling mechanism and especially the information that are delivered and received between the 1st control section and the 2nd control section include information required in order to grasp the hysteresis of processing, such as detection information for processing, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the information storage section, without using a special measuring instrument at all.

[0019] In controlling the body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section as shown in the 3rd viewpoint of the above as a more concrete example The 1st control section which controls the whole processor containing a transport device, and the 2nd control section which controls two or more processing sections are used. The case where the signal delivered and received between the 1st control section and the 2nd control section is accumulated in the information storage section is mentioned. In this case Since the 2nd control section outputs the detection information on each processing section to the 1st control section, the hysteresis of the processing in the processing section of operation can be easily grasped by incorporating the signal delivered and received among these.

[0020] In this case, it is desirable to have the additional detecting element which detects the information to which transfer is not carried out between the 1st control section and the 2nd control section, and for the information storage section to incorporate the signal from this additional detecting element, and to make it accumulate. For example, since this signal is not delivered and received between the 1st control section and the 2nd control section when a driving signal is given to driving members, such as a bulb, from the 2nd control section From the signal delivered and received between the 1st control section and the 2nd control section, although this information cannot be taken out, by detecting such information by the additional detecting element, and making it accumulate in the information storage section, it is more highly precise and can perform grasp of the hysteresis of processing.

[0021]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to an accompanying drawing. Drawing 1 - drawing 4 show the whole resist spreading developer configuration concerning 1 operation gestalt of this invention, and get down, and, for drawing 1 , an outline perspective view and drawing 2 are [an outline front view and drawing 4 of an outline top view and drawing 3] outline side elevations.

[0022] This resist spreading developer 100 controlled the body 101 of equipment, and the body 101 of equipment, and is equipped with the control and the data accumulation section 102 which accumulates information. By the wafer cassette CR, per two or more sheets, for example, 25 sheets, the body 101 of equipment takes out the processed substrate (it is only described as a "wafer" below) W, for example, a semiconductor wafer, from carrying in or a substrate processor to a substrate processor, or from the exterior it The cassette station 10 for carrying in and taking out Wafer W to the wafer cassette CR, The processing station 12

which comes to carry out multistage arrangement of the various processing units of single wafer processing which performs one predetermined processing at a time to Wafer W in a spreading development process in a predetermined location, It has the configuration which connected to one the interface section 14 for delivering Wafer W between the aligners (not shown) which adjoin this processing station 12 and are formed. In addition, control and the data accumulation section 102 are established in the lower part of the cassette station 10.

[0023] The cassette station 10 is movable to a display 16, the cassette installation base 20, the direction of X and the direction of Y, and a Z direction, is constituted by the wafer conveyance device 22 in which it has a pivotable arm 22a for wafer conveyance in the direction of theta, and can lay two or more four wafer cassettes CR on the cassette installation base 20, for example.

[0024] The 1st processing unit group G1 and the 2nd processing unit group G2 which have arranged to multistage the liquid processing unit which the processing station 12 puts Wafer W on a spin chuck within Cup CP, and performs predetermined processing, It consists of 3rd processing unit group G3 and the 4th processing unit group G4 which allotted the heat treatment unit which puts Wafer W on the installation base SP, and performs predetermined processing to multistage, and a main wafer conveyance device 24 of a perpendicular conveyance mold.

[0025] The main wafer conveyance device 24 has equipped the wafer transport device 90 free [rise and fall in the vertical direction (Z direction)] inside the tubed base material 91, as shown in drawing 4 . The tubed base material 91 has become pivotable with the rotation driving force of a motor (not shown), and its wafer transport device 90 is also pivotable in one in connection with it.

[0026] The wafer transport device 90 is equipped with two or more attachment components (pincette) 93 which can move to the cross direction of the conveyance pedestal 92 freely, and realizes delivery of the wafer W between each processing unit by these attachment components 93.

[0027] By the 1st processing unit group G1, the resist spreading unit (COT) which carries out spreading formation of the resist film on a wafer front face with a spin coat method as a liquid processing unit, and the development unit (DEV) which develops the circuit pattern after exposure have put on two steps. The resist spreading unit (COT) and the development unit (DEV) have also put the 2nd processing unit group G2 on two steps.

[0028] By 3rd processing unit group G3 and the 4th processing unit group G4 As a thermal processing unit, for example, the cooling unit which cools Wafer W to predetermined temperature (COL), The adhesion unit which carries out hydrophobing processing of this before applying a photoresist to Wafer W (AD), The extension unit (EXT) for delivering Wafer W between the alignment unit (ALIM) for justifying Wafer W and each station, the hot plate unit (H.P.) which heat-treats Wafer W at predetermined temperature have put on eight steps.

[0029] The pickup cassette CR of portability is arranged in the forward surface part of the interface section 14, the circumference aligner 28 is arranged at the tooth-back section, and the wafer conveyance device 26 is formed in the center section. It has arm 26a for wafer conveyance, and this arm 26a for wafer conveyance moves to the direction of X, and a Z direction, and that of this wafer conveyance device 26 is accessible to cassette CR and the circumference aligner 28. Moreover, this arm 26a for wafer conveyance is pivotable in the direction of theta, and an adjoining aligner side carries out wafer delivery, and it can also access now the extension unit (EXT) belonging to the multistage unit of the 4th processing unit group G4 by the side of the processing station 12 also on a base (not shown).

[0030] Next, with reference to drawing 5 , control and the data accumulation section 102 are explained. Drawing 5 is the block diagram showing the configuration of control and the data accumulation section 102. This control and data accumulation section 102 have the control box 105 which consists of the 1st controller 103 and the 2nd controller 104, and the data accumulation box 106 which incorporates and accumulates the signal delivered and received between the 1st controller 103 and the 2nd controller 104.

[0031] The 1st controller 103 in a control box 105 controls the body of processor 101 whole, and mainly performs recipe management, management of wafer conveyance, and management of the display screen. Moreover, the 1st controller 103 is connected to the host computer 116, and the communication link with a host computer 116 is also performed. And based on the data about these, a command is given to the 2nd controller 104.

[0032] The 2nd controller 104 in a control box 105 controls each processing unit of the body 101 of equipment, and is connected with the sensor, the driving member, etc. through two or more I/O boards. Measurement data, such as temperature and humidity, alarm data, detection data, etc. are outputted to the 1st controller 103, and elements, such as a drive system of each processing unit, are controlled based on a command, sensor

information, etc. on the 1st controller 103.

[0033] The signal line 108 connected to the signal line 107 connected to the 1st controller 103 and the 2nd controller 104 is connected to HUB109, and this HUB109 and data accumulation box 106 are connected with the signal line 110. Therefore, a part of signal [at least] delivered and received by the 1st controller 103 and the 2nd controller 104 can be incorporated and accumulated to the data accumulation box 106 through HUB109. Incorporation of the signal in this case is performed every 2 seconds.

[0034] Moreover, two or more additional sensors (additional detecting element) 111 for detecting the driving signal given to driving members, such as the signal which is not delivered and received by the 1st controller 103 and the 2nd controller 104, for example, a bulb etc., are formed, and these additional sensors 111 are connected to the data accumulation box 106 through the signal line 112. Therefore, the information on this additional sensor 111 can be incorporated and accumulated to the data accumulation box 106. Incorporation of the signal in this case can be performed at intervals of 2 or less seconds.

[0035] The 1st controller 103 is connected to HUB114 through a signal line 113, it connects with the host computer 116 through the signal line 115, and HUB114 transmits the information on the 1st controller 103 to a host computer 116. Moreover, the signal line 117 prolonged from the data accumulation box 106 is connected to HUB114, and the are recording information on the data accumulation box 106 is also transmitted to a host computer 116 through HUB114. Therefore, it is possible to process information in the information from the 1st controller 103 and the information from the data accumulation box 106, and to analyze data with a host computer 116.

[0036] The body interface 121 of equipment which adopts the signal delivered and received by the 1st controller 103 and the 2nd controller 104 as the data accumulation box 106 is shown in drawing 6 , The body agent 122 of equipment who processes the signal, and the additional sensor interface 123 which takes in the information from the additional sensor 111, With the are recording data manager 125 who delivers and receives data between the additional sensor agent 124 who processes the signal, and the body agent 122 of equipment and the additional sensor agent 124, and performs processing and are recording of the further data It has the database management software 126, the database storage section 127 which memorizes the database for data accumulation, and the are recording data storage section 128 which memorizes are recording data.

[0037] Thus, in the resist spreading developer 100 constituted, it takes out one wafer W before processing at a time according to the wafer conveyance device 22 from the wafer cassette CR, and carries in to an alignment unit (ALIM). Subsequently, the wafer W positioned here is taken out according to the main wafer conveyance device 24, it carries in to an adhesion unit (AD), and adhesion processing is performed. Wafer W is taken out according to the main wafer conveyance device 24 after termination of this adhesion processing, and it conveys to a cooling unit (COL), and cools here. Subsequently, Wafer W is conveyed to a resist spreading unit (COT), and resist spreading is performed, and further, prebaking processing is performed in a hot plate unit (H.P.), and it conveys in the interface section 14 through extension cooling (EXTCOL), and conveys to the aligner which adjoins from there. Furthermore, the wafer W with which exposure processing was made with the aligner is conveyed to the processing station 12 through the interface section 14 and an extension unit (EXT) according to the wafer conveyance device 26. At the processing station 12, after performing postbake processing and cooling in a cooling unit (COL) in the hot plate unit (H.P.) after conveying Wafer W to a hot plate unit (H.P.) according to the main wafer conveyance device 24, performing postexposure processing, conveying to a development unit (DEV) further and performing a development, it conveys to the cassette station 10 through an extension unit (EXT). The wafer conveyance device 22 contains the wafer W with which predetermined processing was made as mentioned above to the wafer cassette CR.

[0038] Such a series of processings are controlled by the control box 105 of control and the data accumulation section 102 as mentioned above. And a part of signal [at least] delivered and received between the 1st controller 103 of a control box 105 and the 2nd controller 104 is incorporated and accumulated through HUB109 to the data accumulation box 106 every 2 seconds. At this time, this signal is not involved HUB109, but is processed by the body agent 122 of equipment, and the are recording data manager 125 through the body interface 121 of equipment, and is accumulated in the are recording data storage section 128.

[0039] On the other hand, the information from the additional sensor 111 is incorporated and accumulated in the cycle of 2 or less seconds to the data accumulation box 106. At this time, this signal is processed by the additional sensor agent 124 and the are recording data manager 125 through the additional sensor interface 123, and is similarly accumulated in the are recording data storage section 128.

[0040] The data stored in the database and the are recording data storage section 128 for the data

accumulation accumulated in the database storage section 127 are processed by the predetermined database management software 126, and are outputted to a host computer 116 through HUB114.

[0041] Among such are recording data, since measurement data, such as temperature and humidity, are the period need throughout processing, they are continuously stored for every fixed cycle. Moreover, except it, it is accumulated by every wafer, every lot, and either for every processing, and is accumulated serially. For this reason, the hysteresis of processing can be grasped from the data stored in the data accumulation box 106. As timing of data accumulation, are recording can also be started from the time of Wafer W being carried in to a processing unit, and are recording can also be started after processing of a processing unit is started. Moreover, data can be stored only once in the case of initiation of a lot, or completion, and data can also be similarly stored only once also about Wafer W in the case of initiation (ejection from a carrying-in side cassette) of processing, or completion (delivery to a taking-out side cassette).

[0042] As data which are sampled by the data accumulation box 106 and stored in it, the following five things are illustrated as an example of representation.

1) Data (5) wafer conveyance of drive systems, such as a dispensing data (4) cylinder of the processing liquid in liquid processing units, such as a data (3) spreading processing unit (COT) of the alarm emitted when a trouble arises during measurement data (2) processing of temperature, humidity, an atmospheric pressure, etc., and processing information on a processing unit [0043] Among more than, about the measurement data of (1), it is controlled by the 2nd controller 104, and since it is outputted to the 1st controller 103 from the 2nd controller 104, it is usually accumulated in the data accumulation box 106 through HUB109 between the 1st controller 103 and the 2nd controller 104. However, in the case of the measurement data which are not used for the usual control, the additional sensor 111 can detect, and it can be made to accumulate in the data accumulation box 106 directly.

[0044] About the alarm data of (2), since it is usually emitted in each processing unit, the 2nd controller 104 receives an alarm and it is outputted to the 1st controller 103 from the 2nd controller 104. Therefore, this data can be incorporated and stored in the data accumulation box 106 through HUB109. By storing this data, very fine hysteresis — when the alarm was emitted and whether the alarm was emitted while carrying out what kind of processing where of which processing unit — can be grasped.

[0045] In case the regurgitation of the processing liquid from a nozzle 131 is controlled by closing motion of the air operation bulb 133 through piping 132 about the dispensing data of (3) to be shown in drawing 7 Although an ON/OFF signal is outputted to the solenoid valve 134 for opening and closing the air operation bulb 133 through the I/O board 130 from the 2nd controller 104 The additional sensor 111 can be connected to the control line 135, the additional sensor 111 can detect the above-mentioned ON/OFF signal, and the data can be stored up in the data accumulation box 106. They can deliver and receive such data between the 1st controller 103 and the 2nd controller 104, and although such data are stored up in the immediate-data are recording box 106 from the additional sensor 111 in this way since they are not usually delivered and received between the 1st controller 103 and the 2nd controller 104, they can be made to store them in the data accumulation box 106 through HUB109 in that case. By storing such data, it can grasp [all] at which time of day the air operation bulb 133 opened, or whether it closed, for example, the data and actual dispensing data can be associated and hysteresis can also be grasped.

[0046] The pneumatic cylinder used for rise and fall of a wafer etc. as a typical thing of the drive system of (4) can be mentioned. The control in that case As shown in drawing 8 Output a control signal from the 2nd controller 104 through the I/O board 140 to either the 1st solenoid valve (SOL1) 144 and the 2nd solenoid valve (SOL2) 145, and migration of piston 141a of a pneumatic cylinder 141 is made to start. The detecting signal of either the 1st position sensor (sensor 1) 142 and the 2nd position sensor (sensor 2) 143 is outputted to the 2nd controller 104 through the I/O board 140. It is carried out by stopping migration of piston 141a of a pneumatic cylinder 141 based on the signal. In this case, the additional sensor 111 can be connected to the signal line 146,147 of the 1st and 2nd position sensors 142,143, and the control line 148,149 of the 1st and 2nd solenoid valves 144,145, respectively, the additional sensor 111 can detect the detecting signal of the 1st and 2nd position sensors 142,143, and the keying signal of the 1st and 2nd solenoid valves 144,145, and that data can be stored up in the data accumulation box 106. Dispersion in the timing of operation for every pneumatic cylinder which has grasped the hysteresis of the timing of a pneumatic cylinder 141 of operation by this, for example, has not been grasped until now etc. can be grasped. Therefore, fine tuning of timing of operation etc. is attained.

[0047] The data actually stored grasp serially the closing motion timing of the 1st and 2nd solenoid valves 144,145, and the ON/OFF timing of the 1st and 2nd position sensors 142,143, as shown in drawing 9 . That is, if

the 1st solenoid valve (SOL1) 144 is first made open, when the rise of piston 141a will be started and the 1st position sensor (sensor 1) 142 will operate (ON), the rise of piston 141a stops. Next, if close and the 2nd solenoid valve (SOL2) 145 are made open, descent of piston 141a is started, and when the 2nd position sensor (sensor 2) 143 operates (ON), descent of piston 141a will suspend the 1st solenoid valve (SOL1) 144. [0048] Such data can be delivered and received between the 1st controller 103 and the 2nd controller 104, and although it is made to accumulate in the immediate data recording box 106 from the additional sensor 111 in this way since the data of such a drive system are not usually delivered and received between the 1st controller 103 and the 2nd controller 104, either, it can be made to accumulate in the data accumulation box 106 through HUB109 in that case.

[0049] About wafer conveyance of (5), and the processing information on a processing unit, since the management information of wafer conveyance of the 1st controller 103, the receipts-and-payments information on each processing unit in the 2nd controller 104, and the processing information on each processing unit are delivered and received among these, this data is taken out through HUB109 and it accumulates in the data accumulation box 106. As wafer conveyance information to accumulate, there is information, such as carrying-in initiation of the wafer to each processing unit and each taking-out termination. Moreover, as processing information on each processing unit to accumulate, there is information, such as initiation of the processing in each processing unit and termination.

[0050] Thus, since the signal delivered and received between the 1st controller 103 and the 2nd controller 104 is taken out via HUB109 to predetermined timing and it accumulates in the data accumulation box 106, data required for grasp of the hysteresis of processing can come to hand easily, without being able to store data automatically in the case of processing, and using a special instrumentation for it. That is, since the data delivered and received between the 1st controller 103 and the 2nd controller 104 contain data required in order to grasp the hysteresis of processing, such as detection data for processing, and alarm data, processed data, wafer conveyance data, they can grasp the hysteresis of processing very easily by taking this out and making it accumulate in the data accumulation box 106.

[0051] And since the data with which transfer is not performed between the 1st controller 103 and the 2nd controller 104 using the additional sensor 111 as mentioned above are detected and it was made to accumulate in the data accumulation box 106, the data to store can be made more into Oshi, it is more highly precise and grasp of the hysteresis of processing can be performed.

[0052] In addition, this invention can be variously changed within the limits of the thought of this invention, without being limited to the above-mentioned operation gestalt. For example, although the data delivered and received between the 1st controller 103 and the 2nd controller 104 were incorporated and stored in the data accumulation box 106 with the above-mentioned operation gestalt The data from the 1st controller 103 are incorporated, may make it accumulate, and May also incorporate the data from the 2nd controller 104 and The data from the 1st controller 103, It is good even if it incorporates and accumulates two or more of the data from the 2nd controller 104, and the data which are delivered and received between the 1st controller 103 and the 2nd controller 104. Moreover, what is necessary is for two controllers not to necessarily exist, to incorporate the signal outputted from a controlling mechanism, and just to make it accumulate. Furthermore, although the data from the additional sensor 111 were directly stored in the data accumulation box 106, if all information is delivered and received between the 1st controller 103 and the 2nd controller 104, the additional sensor 111 will not not necessarily have the need.

[0053] Although the above-mentioned operation gestalt showed the case where this invention was applied to a resist spreading developer further again, if the thought of this invention is taken into consideration, it is applicable not only to a resist spreading developer but all processors.

[Translation done.]

NOTICES *

PO and NCIP are not responsible for any damages caused by the use of this translation.

This document has been translated by computer. So the translation may not reflect the original precisely.
***** shows the word which can not be translated.
In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Drawing 1] The outline perspective view showing the whole resist spreading developer configuration concerning operation gestalt of this invention.

Drawing 2] The outline top view showing the whole resist spreading developer configuration concerning 1 operation gestalt of this invention.

Drawing 3] The outline front view showing the whole resist spreading developer configuration concerning 1 operation gestalt of this invention.

Drawing 4] The outline side elevation showing the whole resist spreading developer configuration concerning 1 operation gestalt of this invention.

Drawing 5] The block diagram showing the configuration of the control and the data accumulation section of the resist spreading developer concerning 1 operation gestalt of this invention.

Drawing 6] The block diagram showing the configuration of the data accumulation box in control and the data accumulation section of drawing 5.

Drawing 7] The mimetic diagram showing the example of the data accumulation in the case of the processing liquid regurgitation in the resist spreading developer concerning 1 operation gestalt of this invention.

Drawing 8] The mimetic diagram showing the motion control of the pneumatic cylinder in the resist spreading developer concerning 1 operation gestalt of this invention, and the example of data accumulation.

Drawing 9] The timing chart which shows the data accumulated by the configuration of drawing 8.

[Description of Notations]

100; resist spreading developer (processor)

101; the body of equipment (body of a processor)

102; control and a data accumulation section

103; the 1st controller (the 1st control section)

104; the 2nd controller (the 2nd control section)

105; control box

106; data accumulation box (information storage equipment)

109,114;HUB

111; additional sensor (additional detecting element)

116; host computer

[Translation done.]

: NOTICES *

IPO and NCIPi are not responsible for any
damages caused by the use of this translation.

.This document has been translated by computer. So the translation may not reflect the original precisely.
!.**** shows the word which can not be translated.
!.In the drawings, any words are not translated.

CORRECTION OR AMENDMENT

Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
Section partition] The 3rd partition of the 6th section
Publication date] March 28, Heisei 15 (2003. 3.28)

Publication No.] JP,2002-196815,A (P2002-196815A)
Date of Publication] July 12, Heisei 14 (2002. 7.12)
Annual volume number] Open patent official report 14-1969
Application number] Application for patent 2000-398477 (P2000-398477)
The 7th edition of International Patent Classification]

i05B 23/02 301
5/02
i01L 21/02
!1/027
!1/68

[F]

i05B 23/02 301 V
5/02 M
i01L 21/02 Z
!1/68 A
!1/30 502 G
i62

[Procedure revision]
[Filing Date] December 27, Heisei 14 (2002. 12.27)
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]

[Claim 1] The body of a processor which carries out predetermined processing to a processed object,
The controlling mechanism which controls the body of a processor,
The processor characterized by providing the information storage section which incorporates the signal
outputted from said controlling mechanism, and accumulates the information.
[Claim 2] It is the processor according to claim 1 which said controlling mechanism has the 1st control section
and 2nd control section which perform control which is different to said body of a processor, respectively, and is
characterized by said information storage section incorporating at least one of the signal from said 1st control
section, the signal from said 2nd control section, and the signals that are delivered and received between said
1st control section and 2nd control section.
[Claim 3] The body of a processor which carries out predetermined processing to a processed object,
The controlling mechanism which has the 1st control section and 2nd control section which control the body of

a processor,

The processor characterized by providing the information storage section which incorporates the signal delivered and received between the 1st control section of said controlling mechanism, and the 2nd control section, and accumulates the information.

[Claim 4] It is the processor according to claim 3 characterized by for said body of a processor having the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section, and for said information storage section incorporating the signal from said additional detecting element, and accumulating the information.

[Claim 5] The body of a processor equipped with the transport device which conveys a processed object between two or more processing sections which carry out predetermined processing to a processed object, and each processing section,

The 1st control section which controls the whole processor containing said transport device,

The 2nd control section which controls said two or more processing sections,

The processor characterized by providing the information storage section which incorporates the signal delivered and received between said 1st control section and 2nd control section, and accumulates the information.

[Claim 6] It is the processor according to claim 5 characterized by for said body of a processor having the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section, and for said information storage section incorporating the signal from said additional detecting element, and accumulating the information.

[Claim 7] The processor according to claim 5 or 6 with which said information from the 1st control section and information from said information storage section are characterized by providing further the information processing section which is inputted and analyzes inputted information.

[Claim 8] Said information storage section is a processor given in any 1 term of claim 5 to claim 7 characterized by accumulating at least one sort in measurement information, alarm information, the performance information in said processing section, and the processed object conveyance information by said transport device.

[Claim 9] It is information storage equipment which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which controls the body of a processor,

The information storage section which accumulates information,

information storage equipment characterized by providing a signal supply means to take out the signal outputted from said controlling mechanism, and to supply said information storage section.

[Claim 10] It is information storage equipment according to claim 9 which said controlling mechanism has the 1st control section and 2nd control section which perform control which is different to said body of a processor, respectively, and is characterized by said information storage section incorporating and accumulating at least one of the signal from said 1st control section, the signal from said 2nd control section, and the signals that are delivered and received between said 1st control section and 2nd control section.

[Claim 11] It is information storage equipment which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor,

The information storage section which accumulates information,

information storage equipment characterized by providing a signal supply means to take out the signal delivered and received between the 1st control section of said controlling mechanism, and the 2nd control section, and to supply said information storage section.

[Claim 12] Information storage equipment according to claim 11 characterized by providing further the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section, and an additional detecting-signal supply means to supply the detecting signal of said additional detecting element to said information storage section.

[Claim 13] It is information storage equipment which accumulates information in the processor which consists of the body of a processor equipped with the transport device which conveys a processed object, the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections between two or more processing sections which carry out predetermined processing to a processed object, and each processing section,

The information storage section which accumulates information,

information storage equipment characterized by providing a signal supply means to take out the signal delivered

and received between said 1st control section and 2nd control section, and to supply said information storage section.

[Claim 14] Information storage equipment according to claim 13 characterized by providing the additional detecting element which detects the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section, and an additional detecting-signal supply means to supply the detecting signal of said additional detecting element to said information storage section.

[Claim 15] Said information storage section is information storage equipment according to claim 13 or 14 characterized by accumulating at least one sort in measurement information, alarm information, the performance information in said processing section, and the processed object conveyance information by said transport device.

[Claim 16] It is the information storage approach which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which controls the body of a processor,

The information storage approach characterized by taking out the signal outputted from said controlling mechanism, and accumulating the information.

[Claim 17] Said controlling mechanism is the information storage approach according to claim 16 characterized by accumulating at least one of the signals which have the 1st control section and 2nd control section which perform control which is different to said body of a processor, respectively, and are delivered and received between the signal from said 1st control section, the signal from said 2nd control section, and said 1st control section and 2nd control section.

[Claim 18] It is the information storage approach which accumulates information in the processor which consists of a body of a processor which carries out predetermined processing to a processed object, and a controlling mechanism which has the 1st control section and 2nd control section which control the body of a processor, The information storage approach characterized by taking out the signal delivered and received between the 1st control section of said controlling mechanism, and the 2nd control section, and accumulating the information.

[Claim 19] The information storage approach according to claim 18 characterized by detecting the information to which transfer is not carried out between said 1st control section and 2nd control section, and accumulating the information.

[Claim 20] It is the information storage approach which accumulates information in the processor which consists of the body of a processor equipped with the transport device which conveys a processed object, the 1st control section which controls the whole processor containing said transport device, and the 2nd control section which controls said two or more processing sections between two or more processing sections which carry out predetermined processing to a processed object, and each processing section,

The information storage approach characterized by taking out the signal delivered and received between said 1st control section and 2nd control section, and accumulating the information.

[Claim 21] The information storage approach according to claim 20 characterized by detecting the information to which transfer is not carried out between said 1st control section and 2nd control section in said processing section, and accumulating the information.

[Claim 22] The ejection of said signal is every lot of every processed substrate and a processed substrate, and the information storage approach given in any 1 term of claim 16 to claim 21 characterized by being either for every processing.

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2002-196815

(P2002-196815A)

(43) 公開日 平成14年7月12日 (2002.7.12)

(51) Int.Cl. ⁷	識別記号	F I	テーマコード* (参考)
G 0 5 B 23/02	3 0 1	G 0 5 B 23/02	3 0 1 V 5 F 0 3 1
15/02		15/02	M 5 F 0 4 6
H 0 1 L 21/02		H 0 1 L 21/02	Z 5 H 2 1 5
21/027		21/68	A 5 H 2 2 3
21/68		21/30	5 0 2 G
審査請求 未請求 請求項の数22 O L (全 12 頁) 最終頁に続く			

(21) 出願番号 特願2000-398477 (P2000-398477)

(22) 出願日 平成12年12月27日 (2000. 12. 27)

(71) 出願人 000219967

東京エレクトロン株式会社

東京都港区赤坂5丁目3番6号

(72) 発明者 吉本 裕二

東京都港区赤坂5丁目3番6号 TBS放

送センター 東京エレクトロン株式会社内

(72) 発明者 上村 良一

東京都港区赤坂5丁目3番6号 TBS放

送センター 東京エレクトロン株式会社内

(74) 代理人 100099944

弁理士 高山 宏志

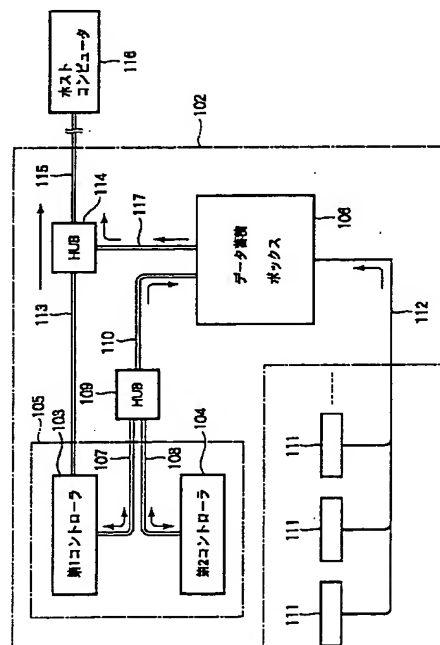
最終頁に続く

(54) 【発明の名称】 処理装置ならびに情報蓄積装置および情報蓄積方法

(57) 【要約】

【課題】 処理の履歴を容易に把握することができる処理装置、ならびにこのような処理の履歴を容易に蓄積することができる情報蓄積装置および情報蓄積方法を提供すること。

【解決手段】 被処理体Wに対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体101と、搬送装置を含む処理装置全体を制御する第1の制御部103と、複数の処理部を制御する第2の制御部104と、第1の制御部103と第2の制御部104との間で授受される信号を取り込みその情報を蓄積する情報蓄積部106とを具備する。



1

【特許請求の範囲】

【請求項1】 被処理体に対して所定の処理を実施する処理装置本体と、
処理装置本体を制御する制御機構と、
前記制御機構から出力される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置。

【請求項2】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、前記情報蓄積部は、前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを取り込むことを特徴とする請求項1に記載の処理装置。

【請求項3】 被処理体に対して所定の処理を実施する処理装置本体と、
処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構と、
前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置。

【請求項4】 前記処理装置本体は、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を有し、前記情報蓄積部は前記付加的検出部からの信号を取り込みその情報を蓄積することを特徴とする請求項3に記載の処理装置。

【請求項5】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、
前記搬送装置を含む処理装置全体を制御する第1の制御部と、
前記複数の処理部を制御する第2の制御部と、
前記第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置。

【請求項6】 前記処理装置本体は、前記処理部において、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を有し、前記情報蓄積部は前記付加的検出部からの信号を取り込みその情報を蓄積することを特徴とする請求項4に記載の処理装置。

【請求項7】 前記第1の制御部からの情報と前記情報蓄積部からの情報とが入力され、入力された情報の解析を行う情報処理部をさらに具備することを特徴とする請求項5または請求項6に記載の処理装置。

【請求項8】 前記情報蓄積部は、計測情報、アラーム情報、前記処理部における動作情報、前記搬送装置による被処理体搬送情報のうち少なくとも1種を蓄積することを特徴とする請求項5から請求項7のいずれか1項に記載の処理装置。

2

【請求項9】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、

情報を蓄積する情報蓄積部と、
前記制御機構から出力される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項10】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、前記情報蓄積部は、前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを取り込んで蓄積することを特徴とする請求項9に記載の情報蓄積装置。

【請求項11】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、
情報を蓄積する情報蓄積部と、

前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項12】 前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部と、
前記付加的検出部の検出信号を前記情報蓄積部に供給する付加的検出信号供給手段とをさらに具備することを特徴とする請求項11に記載の情報蓄積装置。

【請求項13】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積装置であって、
情報を蓄積する情報蓄積部と、

前記第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項14】 前記処理部において、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部と、前記付加的検出部の検出信号を前記情報蓄積部に供給する付加的検出信号供給手段とを具備することを特徴とする請求項13に記載の情報蓄積装置。

【請求項15】 前記情報蓄積部は、計測情報、アラーム情報、前記処理部における動作情報、前記搬送装置による被処理体搬送情報のうち少なくとも1種を蓄積することを特徴とする請求項13または請求項14に記載の情報蓄積装置。

【請求項16】 被処理体に対して所定の処理を実施す

50

る処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記制御機構から出力される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項17】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、かつ前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを蓄積することを特徴とする請求項16に記載の情報蓄積方法。

【請求項18】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項19】 前記第1の制御部と第2の制御部との間で授受が行われない情報を検出し、その情報を蓄積することを特徴とする請求項18に記載の情報蓄積方法。

【請求項20】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項21】 前記処理部における前記第1の制御部と第2の制御部との間で授受が行われない情報を検出し、その情報を蓄積することを特徴とする請求項20に記載の情報蓄積方法。

【請求項22】 前記信号の取り出しは、被処理基板ごと、被処理基板の1ロット毎、および各処理ごとのいずれかであることを特徴とする請求項16から請求項21のいずれか1項に記載の情報蓄積方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、被処理体に対して所定の処理を施す処理装置に関し、詳しくは、処理装置本体の制御に第1の制御部および第2の制御部を含む処理装置、ならびにそれに用いられる情報蓄積装置および情報蓄積方法に関する。

【0002】

【従来の技術】 半導体デバイスの製造においては、被処理基板としての半導体ウエハ上に所定の膜を形成する成膜プロセス、所定の膜にパターンを形成するためのフォ

トリソグラフィ工程、そのパターンに応じて所定の膜をエッチングするエッチング工程等、種々の工程が用いられており、これら工程の処理ごとに成膜装置、レジスト塗布現像装置、エッチング装置等の処理装置が用いられている。

【0003】 これらの処理装置のうち、フォトリソグラフィ工程を行うレジスト塗布現像装置を例にとって説明する。このようなフォトリソグラフィ工程においては、洗浄処理された半導体ウエハに対して、まずアドヒージョン処理ユニットにて疎水化処理を施し、クーリングユニットにて冷却した後、レジスト塗布ユニットにてフォトレジスト膜を塗布形成する。このフォトレジスト膜が形成された半導体ウエハに対し、加熱処理を行うホットプレートユニットにてプリベーク処理を施した後、クーリングユニットにて冷却し、露光装置にて所定のパターンを露光する。引き続き、露光後の半導体ウエハに対してホットプレートユニットにてポストエクスポージャーベーク処理を施した後、クーリングユニットにて冷却し、現像ユニットにて現像液を塗布して露光パターンを現像する。そして、最後に、ホットプレートユニットにてポストベーク処理を施して高分子化のための熱変成、半導体ウエハとパターンとの密着性を強化する。上述のレジスト塗布現像装置は、このような一連の処理工程のうち、露光処理を除く工程を行うものであり、各処理を行う複数の処理ユニットを一体的に集約して構成されており、これら全ての各ユニットに対してウエハの搬入出が可能な搬送装置を有している。

【0004】 このようなレジスト塗布現像装置の制御は、例えば、処理のレシピ、搬送装置の管理やホストコンピュータとの通信等を行う第1の制御部と、第1の制御部からの指令により各処理ユニットにおける各処理を制御する第2の制御部とにより行われる。

【0005】 上述のような装置制御においては、第1の制御部が各処理ユニットの処理に必要な情報を第2の制御部に出力し、第2の制御部では、制御に必要なセンサーからの情報と第1の制御部からの情報とにより各処理ユニットの要素を制御し、その際の制御情報は第1の制御部からホストコンピュータに送信される。

【0006】

【発明が解決しようとする課題】 ところで、上述のような制御では制御に必要な情報は揃っており、制御後の情報も管理されているが、近時、各処理の制御の一層の高精度化が指向されており、また、装置トラブル等のより迅速な対応が望まれており、そのために制御された後の情報のみならず、実際の処理における温度等の計測データ、アラームデータ、駆動系のデータ等を入手して処理の履歴を詳細に把握することが望まれている。

【0007】 しかしながら、従来の処理装置においてこのような履歴を把握するためには、履歴を把握しようとするデータごとに計測装置等を準備する必要があり煩雑

である。また、履歴を把握すべき処理要素は莫大でありこれら処理要素ごとにこのような計測装置等を取り付けることは極めて非現実的である。

【0008】本発明はかかる事情に鑑みてなされたものであって、処理の履歴を容易に把握することができる処理装置、ならびにこのような処理の履歴を容易に蓄積することができる情報蓄積装置および情報蓄積方法を提供することを目的とする。

【0009】

【課題を解決するための手段】上記課題を解決するため、本発明の第1の観点では、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構と、前記制御機構から出力される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置を提供する。

【0010】本発明の第2の観点は、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構と、前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置を提供する。

【0011】本発明の第3の観点では、被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部と、前記第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置を提供する。

【0012】本発明の第4の観点では、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、情報を蓄積する情報蓄積部と、前記制御機構から出力される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置を提供する。

【0013】本発明の第5の観点では、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、情報を蓄積する情報蓄積部と、前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置を提供する。

【0014】本発明の第6の観点では、被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御

部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積装置であって、情報を蓄積する情報蓄積部と、前記第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置を提供する。

【0015】本発明の第7の観点では、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記制御機構から出力される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法を提供する。

【0016】本発明の第8の観点では、被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法を提供する。

【0017】本発明の第9の観点では、被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積方法であって、前記第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法を提供する。

【0018】本発明らは、上記課題を解決するために検討を重ねた結果、制御機構から出力される信号を取り出すこと、特に第1の制御部と第2の制御部との間で授受される信号を取り出すことにより、特別な計測器を用いることなく処理の履歴の把握に必要な情報を容易に入手することができることに想到し本発明を完成するに至った。すなわち、制御機構から出力される信号、特に第1の制御部と第2の制御部との間で授受される情報は、処理のための検出情報等、処理の履歴を把握するために必要な情報を含んでいるから、これを取り出して情報蓄積部に蓄積させることにより特別な計測器を何等用いずに極めて容易に処理の履歴を把握することができる。

【0019】より具体的な例としては、上記第3の観点到示するように、被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体を制御するにあたり、搬送装置を含む処理装置全体を制御する第1の制御部と、複数の処理部を制御する第2の制御部を用い、第1の制御部と第2の制御部との間で授受される信号を情報蓄積部に蓄積する場合が挙げられ、この場合には、第2の制御部が各処理部の検出情報を第1の制御部に出力するので、これらの間で授受される信号を取り込むことにより、処

理部における処理の動作履歴を容易に把握することができる。

【0020】この場合に、第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を有し、この付加的検出部からの信号を情報蓄積部が取り込んで蓄積するようにすることが好ましい。例えば、第2の制御部からバルブ等の駆動部材に駆動信号が与えられる場合、この信号は第1の制御部と第2の制御部との間で授受されないで、この情報は第1の制御部と第2の制御部との間で授受される信号からは取り出すことができないが、このような情報を付加的検出部で検出して情報蓄積部に蓄積させることにより、処理の履歴の把握をより高精度で行うことができる。

【0021】

【発明の実施の形態】以下、添付図面を参照して、本発明の実施の形態について詳細に説明する。図1～図4は、本発明の一実施形態に係るレジスト塗布現像装置の全体構成を示しおり、図1は概略斜視図、図2は概略平面図、図3は概略正面図、図4は概略側面図である。

【0022】このレジスト塗布現像装置100は、装置本体101と、装置本体101を制御し、情報を蓄積する制御・データ蓄積セクション102とを備えている。装置本体101は、被処理基板例えば半導体ウエハ（以下単に「ウエハ」と記す）WをウエハカセットCRで複数枚例えば25枚単位で外部から基板処理装置に搬入または基板処理装置から搬出したり、ウエハカセットCRに対してウエハWを搬入・搬出したりするためのカセットステーション10と、塗布現像工程の中で1枚ずつウエハWに所定の処理を施す枚葉式の各種処理ユニットを所定位置に多段配置してなる処理ステーション12と、この処理ステーション12と隣接して設けられる露光装置（図示せず）との間でウエハWを受け渡しするためのインターフェース部14とを一体に接続した構成を有している。なお、制御・データ蓄積セクション102はカセットステーション10の下部に設けられている。

【0023】カセットステーション10は、表示部16と、カセット載置台20と、X方向、Y方向、Z方向に移動可能でθ方向に回転可能なウエハ搬送用アーム22aを有するウエハ搬送機構22によって構成されており、カセット載置台20上には、複数個例えば4個のウエハカセットCRが載置可能である。

【0024】処理ステーション12は、カップCP内でウエハWをスピンチャックに載せて所定の処理を行う液処理ユニットを多段に配置した第1の処理ユニット群G₁、第2の処理ユニット群G₂と、ウエハWを載置台SPに載せて所定の処理を行う熱処理ユニットを多段に配置した第3の処理ユニット群G₃、第4の処理ユニット群G₄と、垂直搬送型の主ウエハ搬送機構24とで構成されている。

【0025】主ウエハ搬送機構24は、図4に示すよう

に、筒状支持体91の内側に、ウエハ搬送装置90を上下方向（Z方向）に昇降自在に装備している。筒状支持体91はモータ（図示せず）の回転駆動力によって回転可能となっており、それにとまってウエハ搬送装置90も一体的に回転可能となっている。

【0026】ウエハ搬送装置90は、搬送基台92の前後方向に移動自在な複数本の保持部材（ピンセット）93を備え、これらの保持部材93によって各処理ユニット間でのウエハWの受け渡しを実現する。

【0027】第1の処理ユニット群G₁では、液処理ユニットとして例えばスピンコート法によりウエハ表面にレジスト膜を塗布形成するレジスト塗布ユニット（COT）、露光後の回路パターンを現像する現像ユニット（DEV）が2段に重ねられている。第2の処理ユニット群G₂でも、レジスト塗布ユニット（COT）および現像ユニット（DEV）が2段に重ねられている。

【0028】第3の処理ユニット群G₃、第4の処理ユニット群G₄では、熱処理ユニットとして例えばウエハWを所定の温度に冷却するクーリングユニット（COL）、ウエハWにフォトリソを塗布する前にこれを疎水化処理するアドヒージョンユニット（AD）、ウエハWの位置調整を行うためのアライメントユニット（ALIM）、各ステーション間でウエハWの受け渡しを行うためのエクステンションユニット（EXT）、ウエハWを所定の温度で加熱処理するホットプレートユニット（HP）等が8段に重ねられている。

【0029】インターフェース部14の正面部には可搬性のピックアップカセットCRが配置され、背面部には周辺露光装置28が配置され、中央部にはウエハ搬送機構26が設けられている。このウエハ搬送機構26はウエハ搬送用アーム26aを有しており、このウエハ搬送用アーム26aはX方向、Z方向に移動してカセットCRおよび周辺露光装置28にアクセス可能となっている。また、このウエハ搬送用アーム26aは、θ方向に回転可能であり、処理ステーション12側の第4の処理ユニット群G₄の多段ユニットに属するエクステンションユニット（EXT）にも、隣接する露光装置側のウエハ受渡し台（図示せず）にもアクセスできるようになっている。

【0030】次に、図5を参照して、制御・データ蓄積セクション102について説明する。図5は制御・データ蓄積セクション102の構成を示すブロック図である。この制御・データ蓄積セクション102は、第1コントローラ103および第2コントローラ104からなる制御ボックス105と、第1コントローラ103と第2コントローラ104との間で授受される信号を取り込んで蓄積するデータ蓄積ボックス106とを有している。

【0031】制御ボックス105における第1コントローラ103は、処理装置本体101全体の制御を行うも

のであり、主に、レシビ管理、ウエハ搬送の管理、表示画面の管理を行う。また、第1コントローラ103はホストコンピュータ116に接続されており、ホストコンピュータ116との通信も行。そして、これらに関するデータに基づいて第2コントローラ104に対して指令を与える。

【0032】制御ボックス105における第2コントローラ104は、装置本体101の各処理ユニットを制御するものであり、複数のI/Oボードを介してセンサーや駆動部材等と接続されている。温度や湿度等の計測データ、アラームデータ、検出データ等を第1コントローラ103に出力し、第1コントローラ103の指令およびセンサー情報等に基づいて各処理ユニットの駆動系等の要素を制御する。

【0033】第1コントローラ103に接続された信号線107および第2コントローラ104に接続された信号線108はHUB109に接続されており、このHUB109とデータ蓄積ボックス106とは信号線110で接続されている。したがって、第1コントローラ103および第2コントローラ104で授受される信号の少なくとも一部をHUB109を介してデータ蓄積ボックス106へ取り込んで蓄積することができる。この際の信号の取り込みは、例えば2秒ごとに行われる。

【0034】また、第1コントローラ103および第2コントローラ104で授受されない信号、例えばバルブ等の駆動部材に与えられる駆動信号を検出するための複数の付加的センサー（付加的検出部）111が設けられており、これら付加的センサー111は信号線112を介してデータ蓄積ボックス106に接続されている。したがって、この付加的センサー111の情報をデータ蓄積ボックス106へ取り込んで蓄積することができる。この際の信号の取り込みは、例えば2秒以下の間隔で行うことができる。

【0035】第1コントローラ103は信号線113を介してHUB114に接続され、HUB114は信号線115を介してホストコンピュータ116に接続されており、第1コントローラ103の情報をホストコンピュータ116に送信するようになっている。また、HUB114にはデータ蓄積ボックス106から延びる信号線117が接続されていて、データ蓄積ボックス106の蓄積情報もHUB114を介してホストコンピュータ116に送信されるようになっている。したがって、ホストコンピュータ116では、第1コントローラ103からの情報およびデータ蓄積ボックス106からの情報を情報処理してデータの解析を行うことが可能である。

【0036】データ蓄積ボックス106は、図6に示すように、第1コントローラ103および第2コントローラ104で授受される信号を取り入れる装置本体インターフェース121と、その信号を処理する装置本体エージェント122と、付加的センサー111からの情報を

取り入れる付加的センサーインターフェース123と、その信号を処理する付加的センサーエージェント124と、装置本体エージェント122および付加的センサーエージェント124との間でデータの授受を行いさらなるデータの処理および蓄積を行う蓄積データマネージャー125と、データベースマネジメントソフトウェア126と、データ蓄積のためのデータベースを記憶するデータベース記憶部127と、蓄積データを記憶する蓄積データ記憶部128とを有する。

【0037】このように構成されるレジスト塗布現像装置100においては、ウエハカセットCRから処理前のウエハWを1枚ずつウエハ搬送機構22によって搬出し、アライメントユニット（ALIM）へ搬入する。次いで、ここで位置決めされたウエハWを主ウエハ搬送機構24により搬出し、アドヒージョンユニット（AD）に搬入してアドヒージョン処理を施す。このアドヒージョン処理の終了後、ウエハWを主ウエハ搬送機構24により搬出し、クーリングユニット（COL）に搬送して、ここで冷却する。次いで、ウエハWをレジスト塗布ユニット（COT）に搬送してレジスト塗布を行い、さらに、ホットプレートユニット（HP）でプリベーク処理を行って、エクステンション・クーリング（EXTCOL）を介して、インタフェース部14に搬送し、そこから隣接する露光装置に搬送する。さらに、露光装置にて露光処理のなされたウエハWを、ウエハ搬送機構26によりインタフェース部14、エクステンションユニット（EXT）を介して処理ステーション12に搬送する。処理ステーション12において、主ウエハ搬送機構24によりウエハWをホットプレートユニット（HP）に搬送してポストエクスポージャー処理を施し、さらに現像ユニット（DEV）に搬送して現像処理を施した後、ホットプレートユニット（HP）でポストベーク処理を行い、クーリングユニット（COL）において冷却した後、エクステンションユニット（EXT）を介してカセットステーション10に搬送する。以上のようにして所定の処理がなされたウエハWを、ウエハ搬送機構22がウエハカセットCRに収納する。

【0038】このような一連の処理は上述のように、制御・データ蓄積セクション102の制御ボックス105により制御される。そして、制御ボックス105の第1コントローラ103と第2コントローラ104との間で授受される信号の少なくとも一部が、例えば2秒ごとにHUB109を介してデータ蓄積ボックス106へ取り込まれ蓄積される。このとき、この信号はHUB109からまず装置本体インターフェース121を経て装置本体エージェント122および蓄積データマネージャー125により処理され、蓄積データ記憶部128に蓄積される。

【0039】一方、付加的センサー111からの情報は例えば2秒以下のサイクルでデータ蓄積ボックス106

11

へ取り込まれ蓄積される。このとき、この信号は付加的センサーインターフェイス123を経て付加的センサーエージェント124および蓄積データマネージャー125により処理され、同様に蓄積データ記憶部128に蓄積される。

【0040】データベース記憶部127に蓄積されたデータ蓄積のためのデータベースおよび蓄積データ記憶部128に蓄積されたデータは、所定のデータベースマネージメントソフトウェア126により処理され、HUB114を介してホストコンピュータ116へ出力される。

【0041】このような蓄積データのうち、例えば温度や湿度等の計測データは処理の間中必要であるから、一定のサイクルごとに継続して蓄積する。また、それ以外は、例えばウエハごと、ロットごと、および各処理ごとのいずれかで蓄積され、かつ時系列的に蓄積される。このため、データ蓄積ボックス106に蓄積されたデータから処理の履歴を把握することができる。データ蓄積のタイミングとしては、ウエハWが処理ユニットに搬入された時点から蓄積を開始することもできるし、処理ユニットの処理が開始されてから蓄積を開始することもできる。また、ロットの開始または完了の際に1回だけデータを蓄積することもできるし、同様にウエハWについても処理の開始（搬入側カセットからの取り出し）または完了（搬出側カセットへの受け渡し）の際に1回だけデータを蓄積することもできる。

【0042】データ蓄積ボックス106にサンプリングされ、蓄積されるデータとしては、以下の5つのものが代表例として例示される。

- (1) 温度、湿度、気圧等の計測データ
- (2) 処理中にトラブルが生じた際に発するアラームのデータ
- (3) 塗布処理ユニット（COT）等の液処理ユニットにおける処理液のディスペンスデータ
- (4) シリンダ等の駆動系のデータ
- (5) ウエハ搬送および処理ユニットの処理情報

【0043】以上のうち、(1)の計測データについては、第2コントローラ104により制御され、通常、第2コントローラ104から第1コントローラ103に出力されるから、第1コントローラ103と第2コントローラ104との間のHUB109を介してデータ蓄積ボックス106に蓄積される。ただし、通常の制御に用いられない計測データの場合には、付加的センサー111により検出し、直接にデータ蓄積ボックス106に蓄積させることができる。

【0044】(2)のアラームデータについては、通常各処理ユニットにて発せられるから、第2コントローラ104でアラームを受け、第2コントローラ104から第1コントローラ103へ出力される。したがって、このデータはHUB109を介してデータ蓄積ボックス1

12

06に取り込み蓄積することができる。このデータを蓄積することにより、いつアラームが発せられたか、およびどの処理ユニットのどこで、どのような処理をしている時にアラームが発せられたかというような極めて細かい履歴を把握することができる。

【0045】(3)のディスペンスデータについては、図7に示すように、配管132を介してノズル131からの処理液の吐出をエアオペレーションバルブ133の開閉により制御する際に、第2コントローラ104からI/Oボード130を介してエアオペレーションバルブ133を開閉するためのソレノイドバルブ134にON/OFF信号が出力されるが、その制御ライン135に付加的センサー111を接続し、上記ON/OFF信号を付加的センサー111により検出してそのデータをデータ蓄積ボックス106に蓄積させることができる。このようなデータは通常は第1コントローラ103と第2コントローラ104との間で授受されないから、このように付加的センサー111から直接データ蓄積ボックス106に蓄積させるが、このようなデータを第1コントローラ103と第2コントローラ104との間で授受するようにもでき、その際にはHUB109を介してデータ蓄積ボックス106に蓄積させることができる。このようなデータを蓄積することにより、どの時刻にエアオペレーションバルブ133が開いたかあるいは閉じたかを全て把握することができ、例えばそのデータと実際のディスペンスデータとを関連づけて履歴を把握することもできる。

【0046】(4)の駆動系の代表的なものとしてはウエハの昇降等に用いられるエアシリンダーを挙げることができ、その際の制御は、図8に示すように、第2コントローラ104からI/Oボード140を介して第1のソレノイドバルブ（SOL1）144および第2のソレノイドバルブ（SOL2）145のいずれかに制御信号を出力してエアシリンダー141のピストン141aの移動を開始させ、第1の位置センサー（センサー1）142および第2の位置センサー（センサー2）143のいずれかの検出信号をI/Oボード140を介して第2コントローラ104に出力し、その信号に基づいてエアシリンダー141のピストン141aの移動を停止させることにより行われる。この際に、第1および第2の位置センサー142、143の信号ライン146、147ならびに第1および第2のソレノイドバルブ144、145の制御ライン148、149にそれぞれ付加的センサー111を接続し、第1および第2の位置センサー142、143の検出信号ならびに第1および第2のソレノイドバルブ144、145の開閉信号を付加的センサー111により検出してそのデータをデータ蓄積ボックス106に蓄積させることができる。これによりエアシリンダー141の動作タイミングの履歴を把握することができ、例えば今まで把握することができ

なかった、エアシリンダーごとの動作タイミングのばらつき等を把握することができる。したがって、動作タイミングの微調整等が可能となる。

【0047】実際に蓄積されるデータは、図9に示すように、第1および第2のソレノイドバルブ144、145の開閉タイミングおよび第1および第2の位置センサー142、143のON/OFFタイミングを時系列的に把握したものである。すなわち、まず第1のソレノイドバルブ（SOL1）144が開にされるとピストン141aの上昇が開始され、第1の位置センサー（センサー1）142が作動（ON）した時点でピストン141aの上昇が停止する。次に、第1のソレノイドバルブ（SOL1）144を閉および第2のソレノイドバルブ（SOL2）145を開にされると、ピストン141aの下降が開始され、第2の位置センサー（センサー2）143が作動（ON）した時点でピストン141aの下降が停止する。

【0048】このような駆動系のデータも通常は第1コントローラ103と第2コントローラ104との間で授受されないから、このように付加的センサー111から直接データ蓄積ボックス106に蓄積させるが、このようなデータを第1コントローラ103と第2コントローラ104との間で授受するようにもでき、その際にはHUB109を介してデータ蓄積ボックス106に蓄積させることができる。

【0049】（5）のウエハ搬送および処理ユニットの処理情報については、第1コントローラ103のウエハ搬送の管理情報および第2コントローラ104における各処理ユニットでの出し入れ情報および各処理ユニットの処理情報がこれらの間で授受されるから、このデータをHUB109を介して取り出し、データ蓄積ボックス106に蓄積する。蓄積するウエハ搬送情報としては、各処理ユニットへのウエハの搬入開始および各搬出終了等の情報がある。また、蓄積する各処理ユニットの処理情報としては、各処理ユニットにおける処理の開始および終了等の情報がある。

【0050】このようにして、第1コントローラ103および第2コントローラ104の間で授受される信号を所定のタイミングでHUB109を経由して取り出しデータ蓄積ボックス106に蓄積するので、処理の際に自動的にデータを蓄積することができ、特別な計測器を用いることなく処理の履歴の把握に必要なデータを容易に入手することができる。すなわち、第1コントローラ103と第2コントローラ104との間で授受されるデータは、処理のための検出データや、アラームデータ、処理データ、ウエハ搬送データ等、処理の履歴を把握するために必要なデータを含んでいるから、これを取り出してデータ蓄積ボックス106に蓄積させることにより極めて容易に処理の履歴を把握することができる。

【0051】しかも、上述のように付加的センサー11

1を用いて第1コントローラ103と第2コントローラ104との間で授受が行われないデータを検出してデータ蓄積ボックス106に蓄積するようにしたので、蓄積するデータをより多様にすることができ、処理の履歴の把握をより高精度で行うことができる。

【0052】なお、本発明は上記実施形態に限定されることなく、本発明の思想の範囲内で種々変更可能である。例えば、上記実施形態では第1コントローラ103と第2コントローラ104との間で授受されるデータをデータ蓄積ボックス106に取り込み蓄積するようにしたが、第1コントローラ103からのデータを取り込んで蓄積するようにしてもよいし、第2コントローラ104からのデータを取り込んで蓄積するようにしてもよいし、第1コントローラ103からのデータ、第2コントローラ104からのデータ、および第1コントローラ103と第2コントローラ104との間で授受されるデータのうち2つ以上を取り込んで蓄積するにいてもよい。また、必ずしも2つのコントローラが存在する必要はなく、制御機構から出力される信号を取り込んで蓄積するようにすればよい。さらに、付加的センサー111からのデータをデータ蓄積ボックス106に直接蓄積するようにしたが、全ての情報を第1コントローラ103と第2コントローラ104との間で授受するようにすれば、付加的センサー111は必ずしも必要はない。

【0053】さらにまた、上記実施形態では、本発明をレジスト塗布現像装置に適用した場合について示したが、本発明の思想を考慮すると、レジスト塗布現像装置に限らず、あらゆる処理装置に適用可能である。

【0054】

【発明の効果】以上説明したように、本発明によれば、制御機構から出力される信号を取り出すこと、特に第1の制御部と第2の制御部との間で授受される信号を取り出すことにより、特別な計測器を用いることなく処理の履歴の把握に必要な情報を容易に入手することができる。すなわち、制御機構から出力される信号、特に第1の制御部と第2の制御部との間で授受される情報は、処理のための検出情報等、処理の履歴を把握するために必要な情報を含んでいるから、これを取り出して情報蓄積部に蓄積させることにより特別な計測器を何等用いずに極めて容易に処理の履歴を把握することができる。

【0055】また、第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を用い、この付加的検出部からの信号を情報蓄積部が取り込んで蓄積するようにすることにより、第1の制御部と第2の制御部との間で授受される信号からは取り出すことができない情報を情報蓄積部に蓄積させることができ、処理の履歴の把握をより高精度で行うことができる。

【図面の簡単な説明】

【図1】本発明の一実施形態に係るレジスト塗布現像装置の全体構成を示す概略斜視図。

15

【図2】本発明の一実施形態に係るレジスト塗布現像装置の全体構成を示す概略平面図。

【図3】本発明の一実施形態に係るレジスト塗布現像装置の全体構成を示す概略正面図。

【図4】本発明の一実施形態に係るレジスト塗布現像装置の全体構成を示す概略側面図。

【図5】本発明の一実施形態に係るレジスト塗布現像装置の制御・データ蓄積セクションの構成を示すブロック図。

【図6】図5の制御・データ蓄積セクションにおけるデータ蓄積ボックスの構成を示すブロック図。

【図7】本発明の一実施形態に係るレジスト塗布現像装置における処理液吐出の際のデータ蓄積の例を示す模式図。

【図8】本発明の一実施形態に係るレジスト塗布現像装

* 置におけるエアシリンダーの動作制御およびデータ蓄積の例を示す模式図。

【図9】図8の構成により集積したデータを示すタイミングチャート。

【符号の説明】

100；レジスト塗布現像装置（処理装置）

101；装置本体（処理装置本体）

102；制御・データ蓄積セクション

103；第1コントローラ（第1の制御部）

104；第2コントローラ（第2の制御部）

105；制御ボックス

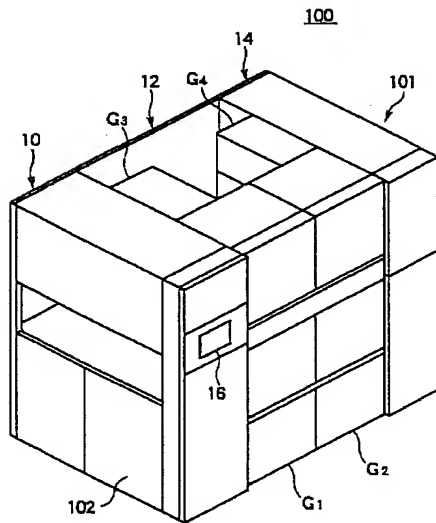
106；データ蓄積ボックス（情報蓄積装置）

109、114；HUB

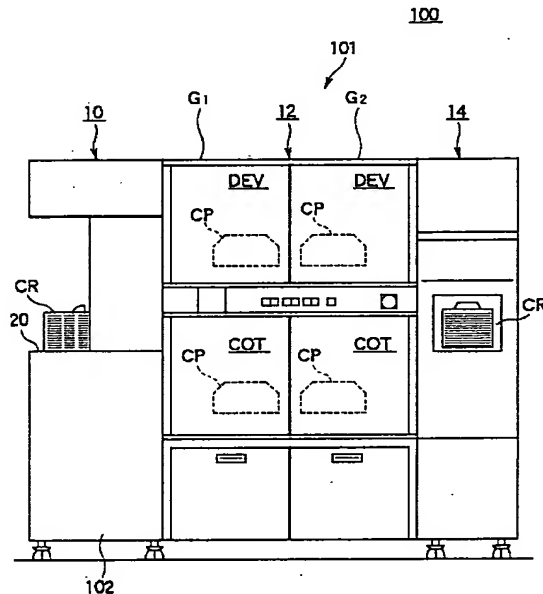
111；付加的センサー（付加的検出部）

116；ホストコンピュータ

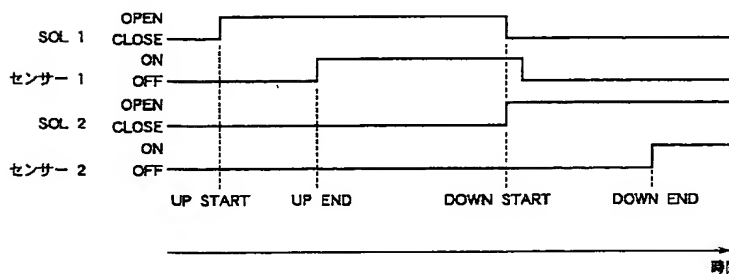
【図1】



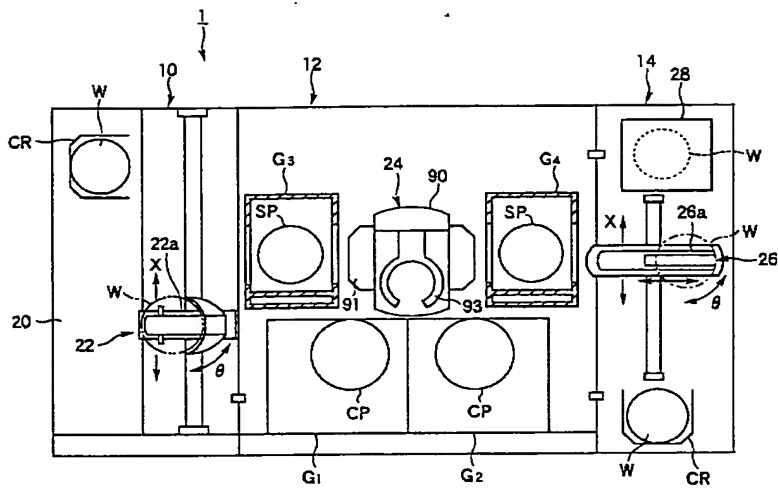
【図3】



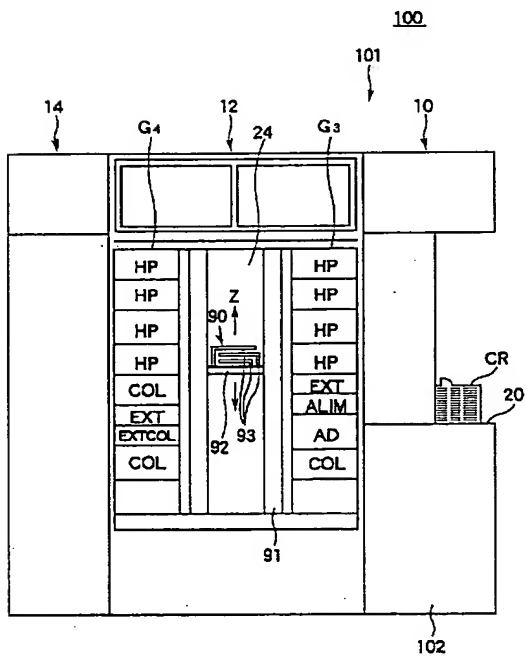
【図9】



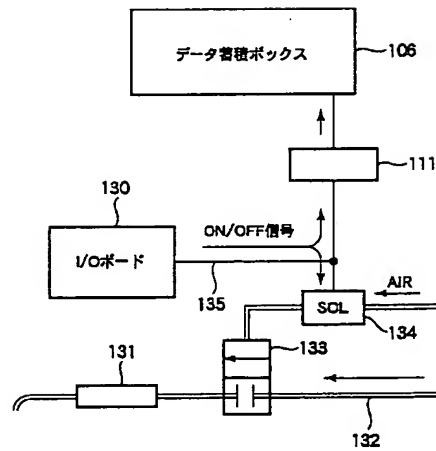
【図2】



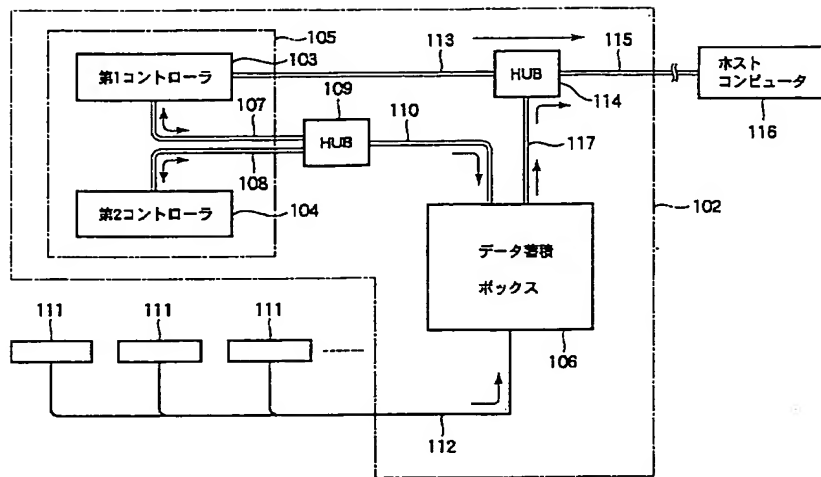
【図4】



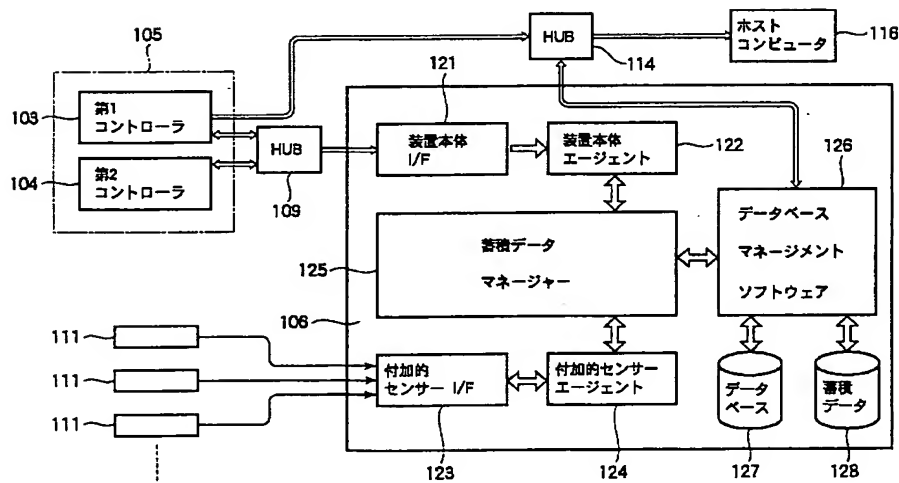
【図7】



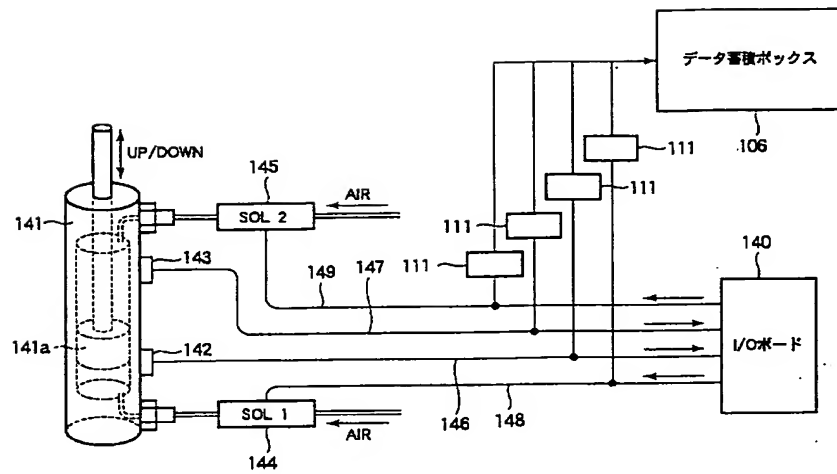
【図5】



【図6】



【図8】



フロントページの続き

(51)Int.Cl.⁷

識別記号

F I

テーマコード (参考)

H 0 1 L 21/30

5 6 2

(72)発明者 緒方 久仁恵

東京都港区赤坂五丁目3番6号 TBS放
送センター 東京エレクトロン株式会社内

(72)発明者 出口 洋一

東京都港区赤坂五丁目3番6号 TBS放
送センター 東京エレクトロン株式会社内

F ターム (参考) 5F031 CA02 FA01 FA12 MA24 MA26
MA27 MA28 MA32 PA04
5F046 CD01 CD05 DA29 DD06 HA02
JA04 JA22 KA04 LA01 LA18
5H215 AA20 BB12 CC07 CX04 GG03
GG05 GG11 KK04
5H223 AA20 BB01 DD05 DD07 EE06
EE15 EE17

【公報種別】特許法第17条の2の規定による補正の掲載

【部門区分】第6部門第3区分

【発行日】平成15年3月28日(2003.3.28)

【公開番号】特開2002-196815(P2002-196815A)

【公開日】平成14年7月12日(2002.7.12)

【年通号数】公開特許公報14-1969

【出願番号】特願2000-398477(P2000-398477)

【国際特許分類第7版】

G05B 23/02 301

15/02

H01L 21/02

21/027

21/68

【FI】

G05B 23/02 301 V

15/02 M

H01L 21/02 Z

21/68 A

21/30 502 G

562

【手続補正書】

【提出日】平成14年12月27日(2002.12.27)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】 被処理体に対して所定の処理を実施する処理装置本体と、
処理装置本体を制御する制御機構と、
前記制御機構から出力される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置。

【請求項2】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、前記情報蓄積部は、前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを取り込むことを特徴とする請求項1に記載の処理装置。

【請求項3】 被処理体に対して所定の処理を実施する処理装置本体と、
処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構と、
前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部

とを具備することを特徴とする処理装置。

【請求項4】 前記処理装置本体は、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を有し、前記情報蓄積部は前記付加的検出部からの信号を取り込みその情報を蓄積することを特徴とする請求項3に記載の処理装置。

【請求項5】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、
前記搬送装置を含む処理装置全体を制御する第1の制御部と、
前記複数の処理部を制御する第2の制御部と、
前記第1の制御部と第2の制御部との間で授受される信号を取り込みその情報を蓄積する情報蓄積部とを具備することを特徴とする処理装置。

【請求項6】 前記処理装置本体は、前記処理部において、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部を有し、前記情報蓄積部は前記付加的検出部からの信号を取り込みその情報を蓄積することを特徴とする請求項5に記載の処理装置。

【請求項7】 前記第1の制御部からの情報と前記情報蓄積部からの情報とが入力され、入力された情報の解析を行う情報処理部をさらに具備することを特徴とする請求項5または請求項6に記載の処理装置。

【請求項8】 前記情報蓄積部は、計測情報、アラーム情報、前記処理部における動作情報、前記搬送装置によ

る被処理体搬送情報のうち少なくとも1種を蓄積することを特徴とする請求項5から請求項7のいずれか1項に記載の処理装置。

【請求項9】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、
情報を蓄積する情報蓄積部と、
前記制御機構から出力される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項10】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、前記情報蓄積部は、前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを取り込んで蓄積することを特徴とする請求項9に記載の情報蓄積装置。

【請求項11】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積装置であって、
情報を蓄積する情報蓄積部と、
前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項12】 前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部と、前記付加的検出部の検出信号を前記情報蓄積部に供給する付加的検出信号供給手段とをさらに具備することを特徴とする請求項11に記載の情報蓄積装置。

【請求項13】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積装置であって、
情報を蓄積する情報蓄積部と、
前記第1の制御部と第2の制御部との間で授受される信号を取り出し前記情報蓄積部に供給する信号供給手段とを具備することを特徴とする情報蓄積装置。

【請求項14】 前記処理部において、前記第1の制御部と第2の制御部との間で授受が行われない情報を検出する付加的検出部と、前記付加的検出部の検出信号を前記情報蓄積部に供給する付加的検出信号供給手段とを具備することを特徴とする請求項13に記載の情報蓄積装置。

置。

【請求項15】 前記情報蓄積部は、計測情報、アラーム情報、前記処理部における動作情報、前記搬送装置による被処理体搬送情報のうち少なくとも1種を蓄積することを特徴とする請求項13または請求項14に記載の情報蓄積装置。

【請求項16】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、
前記制御機構から出力される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項17】 前記制御機構は、前記処理装置本体に対してそれぞれ異なる制御を行う第1の制御部および第2の制御部を有し、かつ前記第1の制御部からの信号、前記第2の制御部からの信号、および前記第1の制御部と第2の制御部との間で授受される信号のうち少なくとも1つを蓄積することを特徴とする請求項16に記載の情報蓄積方法。

【請求項18】 被処理体に対して所定の処理を実施する処理装置本体と、処理装置本体を制御する第1の制御部および第2の制御部を有する制御機構とからなる処理装置において情報を蓄積する情報蓄積方法であって、
前記制御機構の第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項19】 前記第1の制御部と第2の制御部との間で授受が行われない情報を検出し、その情報を蓄積することを特徴とする請求項18に記載の情報蓄積方法。

【請求項20】 被処理体に対して所定の処理を実施する複数の処理部と各処理部間で被処理体を搬送する搬送装置とを備えた処理装置本体と、前記搬送装置を含む処理装置全体を制御する第1の制御部と、前記複数の処理部を制御する第2の制御部とからなる処理装置において情報を蓄積する情報蓄積方法であって、
前記第1の制御部と第2の制御部との間で授受される信号を取り出しその情報を蓄積することを特徴とする情報蓄積方法。

【請求項21】 前記処理部における前記第1の制御部と第2の制御部との間で授受が行われない情報を検出し、その情報を蓄積することを特徴とする請求項20に記載の情報蓄積方法。

【請求項22】 前記信号の取り出しは、被処理基板ごと、被処理基板の1ロット毎、および各処理ごとのいずれかであることを特徴とする請求項16から請求項21のいずれか1項に記載の情報蓄積方法。

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.